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ABSTRACT

This publication provides abstracts of 43 active and 34 completed projects designed to improve pediatric emergency care. The projects were funded by the United States Department of Health and Human Services' Maternal and Child Health Bureau, in collaboration with the United States Department of Transportation's National Highway Traffic Safety Administration. Issues addressed by these projects include the entire continuum of pediatric emergency care, from injury prevention and emergency medical services access through prehospital and emergency department care, intensive care, rehabilitation, and reintegration into the community. The abstracts of active projects are organized into seven categories: planning grants, implementation grants, enhancement grants, resource centers, targeted issues grants, research grants, and continuing education grants. Each abstract for both active and completed projects contains: (1) the name, location, director, and grant number; (2) the problem addressed; (3) goals and objectives; (4) methodology; (5) evaluation; and, in some cases, (6) experience to date. (MDM)

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ED 381 285

Emergency Medical Services for Children

Abstracts of Active Projects FY 1995

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Emergency Medical Services for Children℠

MCHB/NHTSA

National Center for Education in Maternal and Child Health

MCHB

Maternal and Child Health Bureau

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PS 023226

Emergency Medical Services for Children

Abstracts of Active Projects FY 1995

Supported by the
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PREFACE

This publication documents the scope of efforts to improve pediatric emergency care in States that have received funding for emergency medical services for children (EMSC). These projects are funded by the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, in collaboration with the U.S. Department of Transportation, National Highway Traffic Safety Administration. The projects described in this publication cover a wide spectrum of geographic, organizational, and program resources and conditions, and offer a range of models for replication or modification by other States and localities. Each project is unique, addressing EMSC issues differently and using a variety of resources and personnel.

The need to integrate pediatric emergency care into emergency medical services for children was indicated by research in the late 1970s. The research showed that in emergency care systems children had higher mortality and morbidity rates than adults. However, when children had access to a higher level of care, their mortality and morbidity decreased. The importance of EMSC was summarized in 1993 in the Institute of Medicine report *Emergency Medical Services for Children*. The report recommends continued support for improvement in pediatric emergency care.

EMSC projects have been funded since 1985. The earliest projects provided demonstration models for integrating emergency medical services for children into existing emergency medical services (EMS) systems. Later projects implemented and expanded many of the earlier models. In 1994, eight new enhancement grants were awarded to enable States that had previously received a demonstration or implementation grant to build on those activities and continue to improve the system. A new grant category, planning, was also added in 1994 to help States that had never received an EMSC grant conduct a needs assessment and do preliminary planning before implementing a full-scale program. For several years, grants for targeted issues have been available for exploring various aspects of pediatric emergency care or developing specific resources.

Since 1991, resource center grants have been awarded to provide EMSC information nationally. The two centers receiving grants are the National EMSC Resource Alliance in Torrance, CA, and the EMSC National Resource Center in Washington, DC. These centers organize and disseminate information about current and previous projects and grant products, provide technical assistance in EMSC, and assist new grantees in implementing programs and in building coalitions with private, public, and volunteer organizations. Research grants in EMSC have also been awarded in order to improve our knowledge of how best to serve children in the system. Continuing education grants for conference support became available in 1994.

The transfer of knowledge gained in implementing EMSC is important in preventing duplication of effort and maximizing resources. EMSC projects are consistently encouraged to share information, network with other States and localities, and develop regional systems. Developing strategies for generating and maintaining State and local support for EMSC has become an essential activity; coalition building at the local, State, and national levels ensures ongoing interest and support of EMSC. Continuation of several EMSC projects after completion of grant funding has also been ensured in several States through legislation and other means.

EMSC projects address the entire continuum of pediatric emergency care, from injury prevention and EMS access through prehospital and emergency department care, intensive care, rehabilitation, and reintegration into the community. Pediatric components such as injury prevention, training, and transport and transfer protocols have been integrated into EMS systems in States receiving EMSC funding.

In this publication, EMSC abstracts are organized into the following State systems grant categories: Planning, Implementation, and Enhancement. Resource Center, Targeted Issues, Research, and Continuing Education grants are identified separately. The appendix includes previously funded projects. The EMSC projects listed in this document represent only a small segment of the more than 800 active projects supported by the Maternal and Child Health Bureau in all areas of maternal and child health.

PLANNING GRANTS

Emergency Medical Services for Children
Connecticut Department of Health and
Addiction Services
150 Washington Street
Hartford, CT 06106
(203) 566-7336
(203) 566-7172 fax

EMSC
MCH-094001
10/01/94–09/30/96
Project Director(s):
E. Marie Wilson, R.N.

PROBLEM: On the systemwide level in Connecticut, few comprehensive emergency medical services for children (EMSC) programs have been developed. Emergency medical services (EMS) capabilities that have been enhanced are the result of local efforts. This lack of coordination of efforts creates an imbalance in the level of service available to pediatric patients throughout the State. Historically, EMS capabilities for pediatric patients have not been specifically targeted for enhancement but, rather, have been incorporated into general improvements of the overall EMS system. This approach has ignored the fact that children are more than "little adults"; they are, in fact, a special population with unique EMS needs.

GOALS AND OBJECTIVES: The major goals of the project are to: (1) Identify the current status of EMS pediatric capability in the State through a review and analysis of the efforts to enhance local programs; and (2) create a plan to develop comprehensive EMSC programs in a coordinated, systemic fashion. Major objectives of the first goal include a scientific review of current data; identification of additional necessary information; and development of mechanisms to capture this information. Major objectives of the second goal include a review of the total data collected; use of pediatric specialists and others with knowledge and experience in EMS and EMSC issues to develop a needs assessment for the State; and use of these specialists and others, including EMS experts and consumers, to finalize a detailed plan for resolving areas of need.

METHODOLOGY: The Connecticut Department of Public Health and Addiction Services (DPHAS), through its Office of Emergency Medical Services (OEMS), will be responsible for administering this project. The director of OEMS reports directly to the deputy commissioner of operations for DPHAS. The OEMS is statutorily established within DPHAS for the purposes of licensing and certifying emergency medical services (EMS) personnel and provider organizations, overseeing and inspecting EMS equipment and facilities, setting rates, and developing the State's EMS programs.

Through this project the State will, for the first time, have an individual whose sole responsibility and focus will be the development of a statewide EMSC system. This person will work closely with the Pediatric Committee of the commissioner's EMS Advisory Board in all phases of the project.

The needs assessment will be based on data collection and analysis. Existing data will be obtained through the Connecticut Hospital Information Management Exchange data base of the Connecticut Hospital Research Education Foundation. For areas of concern in which current data are not available, survey instruments will be prepared and distributed to applicable elements of the EMS system. Analysis will determine statistically significant findings for inclusion in the needs assessment report. Survey targets will include prehospital and hospital personnel and organizations, consumers, community-based health care providers, pediatric specialists, and school nurses.

Problems will be identified through analysis of the data by the Pediatric Committee, consulting epidemiologists, and DPHAS. Prioritization of problems will be based on (1) short-term efforts to augment existing resources and impact the issues affecting the largest pediatric populations, and (2) long-term efforts to develop new capabilities and target issues affecting specific subgroups of the pediatric population.

Creation of the 5-year EMSC plan will be based on the needs assessment, problem identification, and prioritization. The plan will be subject to review and approval by the Pediatric Committee, the EMS Advisory

Board, and the commissioner. The Funding Committee of the Advisory Board will explore funding sources through the State legislature, local and Federal agencies, and private grantors.

EVALUATION: The submitted schedule of events will be used to track project activities. Staff evaluation will be based on completion of objectives in a timely fashion. Contracting for an individual with demonstrated expertise in data collection and analysis will ensure that appropriate scientific methodologies are used to develop survey instruments and identify statistically significant information derived from this investigation.

The major deliverables in the project are the needs assessment report and the 5-year EMSC plan. These products will be reviewed and approved by the commissioner's EMS Advisory Board, which has expertise in all aspects of EMS. The final EMSC plan will receive public comment and be approved by the commissioner of DPHAS.

Illinois Emergency Medical Services for Children Needs Assessment Survey

Loyola University of Chicago
2160 South First Avenue
Maywood, IL 60153
(708) 216-3671 or 216-5881

EMSC
MCH-174001
10/01/94–09/30/96
Project Director(s):
Ron W. Lee, M.D., M.B.A.
Contact Person:
John A. Robinson, M.D.

PROBLEM: Currently Illinois has no statewide plan or program for emergency medical services for children (EMSC). This lack of a focused understanding of the needs of children and a method to address deficiencies has resulted in differences in care. Illinois continues to experience an increase in homicide deaths of children ages 5–14 and in unintentional deaths of children ages 1–4. These deaths are the consequences not only of significant poverty and a lack of health care resources but also of a system that is fragmented and poorly subsidized in its approach to the emergency care of children. Several components remain significant obstacles to the development of an EMSC system: Deficiency in knowledge about the extent and severity of pediatric problems; an inability to develop a consensus on the priority of each problem; lack of widely accepted standards of access, care, and prevention; inconsistent education efforts; and lack of a statewide program of monitoring, review, and research focused on emergency pediatric care.

GOALS AND OBJECTIVES: Loyola University of Chicago, in collaboration with the Illinois Department of Public Health (IDPH), seeks to establish an EMSC system in Illinois. Achievement of an EMSC system must include enhancement of the current constituency that is committed to the concept of an EMSC system and empowered to define requirements, establish priorities, coordinate activities to address deficiencies, and define a plan of implementation. This can be accomplished by recruiting vested individuals and agencies that will complete a needs assessment while developing a mechanism of data collection that permits monitoring and refinement of an EMSC program. This group must be authorized through IDPH to establish a framework for organizing specialized centers of pediatric care and developing standards reflective of optimal access, triage, transport, care, and injury prevention. This coalition of individuals and agencies must provide for ongoing leadership through an advisory board that addresses educational and training deficiencies of health care providers, public awareness of pediatric needs, and research activities that seek new solutions to old problems.

METHODOLOGY: Successful attainment of the goals and objectives will occur through direct appeal by the director of public health to key agencies intrinsic to the implementation of an EMSC program and intensive championing of demonstrated pediatric needs to the public, providers, and consumers. These demonstrated needs will be derived from a comprehensive needs assessment using established EMSC survey tools. This needs assessment will quantify inadequacies in prehospital, emergency department, and acute care and rehabilitation centers. There will be an effort to define difficulties in access or 911 issues and injury prevention in schools. The information provided by the needs assessment will be used by several task forces authorized by IDPH to develop recommendations specific to pediatric care standards.

Coalition building has been and will continue to be a priority issue. Outreach by personal contact will be supplemented with a promotional campaign. Promotional materials have been identified, and specific groups such as school nurses, parent-teacher organizations, and police will be targeted to enlist their involvement in the structuring of an Illinois EMSC system. A second area of coalition building will occur in the seven medical schools and centers in Illinois. The enlistment of these institutions in developing an EMSC system will be especially important in improvement efforts and research. The development of a system of E coding of pediatric emergency department visits will be the first step in establishing the research component of an Illinois EMSC system.

EVALUATION: A State-appointed EMSC advisory board will monitor and evaluate the ongoing activities of the planning project. It is expected that a 30-percent return on all surveys will yield sufficient information to identify and evaluate problems. The onsite interviews have also been proven in other EMSC programs (i.e., Ohio's) to provide additional information and improve validity in the survey methodology. The use of a State-appointed advisory board has been successful in the management of both the emergency medical services program and the trauma program in Illinois. This method of management will provide the broadest representation and highest visibility for our program.

A Plan to Improve EMSC in Puerto Rico

Department of Health
Office of Emergency Medical Services
Call Box 70184
San Juan, PR 00936
(809) 765-1733 or 765-1594
(809) 765-5085 fax

EMSC
MCH-434001
10/01/94–09/30/96
Project Director(s):
Ivan Rosario Rosada, M.D.
Contact Person:
Amaury Hernandez

GOALS AND OBJECTIVES: The Office of Emergency Medical Services (OEMS), Department of Health, is of developing a plan for improving emergency medical services for children (EMSC) in Puerto Rico. To achieve this goal, the Puerto Rico OEMS will create an advisory committee composed of representative from the medical community, public safety organizations, and the Fire Corps.

The objective of this EMSC project is to improve pediatric medical care in the following areas:

1. Injury prevention;
2. Prehospital medical care;
3. Emergency medical care for children;
4. Specialized medical care for children; and
5. Pediatric rehabilitation services.

METHODOLOGY: The advisory committee will conduct a needs assessment to identify current problems in the delivery of care within Puerto Rico's EMSC system. OEMS will hire a project coordinator, who will be responsible for collecting all the necessary data from hospital and prehospital services. These data will be used by the advisory committee as part of the process of finding possible solutions to the problems identified in the assessment. After the data-gathering process is completed, the advisory committee will develop a grant proposal for implementing these solutions.

Wyoming EMSC Project:
System Enhancement
Wyoming State Health Department
Hathaway Building
Room 526
Cheyenne, WY 82002
(307) 777-7955
(307) 777-5639 fax

EMSC
MCJ-564001
10/01/94–09/30/96
Project Director(s):
Jimm Murray

PROBLEM: The Wyoming Office of Emergency Medical Services (WYOEMS), located in the Division of Preventive Medicine, Wyoming Department of Health, will be the lead agency for this project. During this project, WYOEMS will study issues related to emergency medical services for children (EMSC) in Wyoming and produce a State plan for EMSC.

GOALS AND OBJECTIVES: The goals of the Wyoming EMSC project are to:

1. Develop a comprehensive plan for the delivery of EMSC;
2. Develop and implement a data and surveillance system to obtain accurate data and information on which to make long-term decisions regarding EMS in Wyoming; and
3. Reduce morbidity and mortality among Wyoming's children.

The objectives are to:

1. Create a task force of Wyoming professionals whose mission will be to develop an effective statewide plan for EMSC;
2. Recruit Wyoming trauma care professionals to be involved in the EMSC system on a long-term basis;
3. Plan an EMSC data and surveillance system in order to obtain accurate information from which to implement plans based on the identified needs;
4. Collect and analyze information developed and produced by other EMSC programs throughout the Nation to determine which strategies developed by other EMSC programs would be applicable to Wyoming's system;
5. Establish minimum pediatric standards for prevention and service delivery; and
6. Collect, review, and analyze the state-of-the-art in training, software, slide, and interactive video disk programs and field management protocols for possible adoption in Wyoming.

METHODOLOGY: A statewide EMSC task force of professionals will be appointed to study the issues of EMSC in Wyoming. It is anticipated that the task force will include three pediatricians, two emergency room physicians, two emergency medical technicians (EMTs), and two nurses. Once appropriate data have been obtained, the EMSC task force will produce a written State plan for EMSC in Wyoming. The pediatric medical director of the Wyoming EMSC project will travel throughout Wyoming to elicit interest and input from pediatricians, physicians, nurses, EMTs, and so on. Data will be obtained from a variety of sources, including the Wyoming Hospital Association, the Wyoming Heart Association, and medicaid. Data will be analyzed using Epi-Info, a software package from the Centers for Disease Control and Prevention. A full-time, nonbenefited secretary will be hired to perform daily activities, assist in the collection and cataloging of a variety of EMSC-related materials, manage the data, and complete travel vouchers for the EMSC task force. This person will help the OEMS program manager to plan (1) travel to two successful EMSC State programs and (2) a regional knowledge transfer workshop of EMSC project directors to be held in Cheyenne, WY. The OEMS program manager will contribute 20 percent in-kind time. The administrator of the Division of Preventive Medicine and

State epidemiologist will contribute 10 percent in-kind time, as will the OEMS training coordinator and the OEMS licensing officer. The assistant State epidemiologist will contribute 5 percent in-kind time to the project. The nine task force members will also donate their time to attend five face-to-face meetings and participate in conference calls. Task force members will be reimbursed only for travel expenses.

EVALUATION: Evaluation criteria have been described in depth elsewhere. Most criteria relate to the collection, analysis, and dissemination of data so that a statewide EMSC plan can be produced. The completion of activities that relate directly to the accomplishment of objectives and goals will be documented. The OEMS program manager will ensure that all evaluation criteria are met. The completion of Wyoming's EMSC plan will be used to determine the overall success of this planning project.

IMPLEMENTATION GRANTS

Arizona Emergency Medical Services for Children
University of Arizona
College of Medicine
Arizona Emergency Medicine Research Center
1501 North Campbell
Tucson, AZ 85724
(602) 626-6312

EMSC
MCH-044001
10/01/92-09/30/95
Project Director(s):
Daniel W. Spaite, M.D.

PROBLEM: Arizona has extremely high mortality and morbidity rates from trauma and unintentional injury and one of the highest drowning rates in the country. Since these events preferentially affect children, the need for improvement in the emergency medical care of these patients as well as efforts to prevent these events is of tremendous importance. Initial training as well as continuing education programs in emergency medical services for children (EMSC) have been virtually inaccessible for emergency medical services (EMS) personnel in rural Arizona, which also lacks adequate childhood injury prevention programs. This is partly attributable to the enormous geographic barriers that impede delivery and improvement of EMSC education and childhood injury prevention programs within the State.

GOALS AND OBJECTIVES: This project targets the large Hispanic and Native American population in rural Arizona communities and the Indian Health Service (IHS) units throughout Arizona and western New Mexico. The four main goals follow:

1. Broad-based training and education in the prehospital and early hospital emergency medical care of children;
2. Broad-based injury prevention education and training of EMS personnel to develop community-based prevention programs emphasizing child restraints, seatbelts, bicycle safety, bicycle helmets, and drowning prevention;
3. Evaluation of EMSC training and injury prevention programs on specific outcome parameters in target areas; and
4. Continued and expanded statewide EMSC education and injury prevention programs through future grants.

METHODOLOGY: Nurse health educators will continue to provide broad-based training and education to prehospital and early hospital medical personnel involved in the emergency medical care of children. The educators will use a modified North Carolina EMSC curriculum, together with portions of EMSC curriculums from Washington, Utah, and New Mexico. Educational programs are coordinated through area EMS provider agencies and hospitals or with IHS units. We are negotiating with one of the IHS units for a "nurse liaison" who will give direct input into continuing medical education and delivery of emergency medical services for children to the local IHS area. The Pediatric Advanced Life Support (PALS) component will be coordinated through area health education centers throughout the State.

Injury prevention programs will be extended to as many rural communities as possible by (1) continuing the subcontract with Tucson Fire Department Childhood Injury Prevention Programs, (2) modeling satellite SAFE KIDS Coalitions in rural communities after the Tucson SAFE KIDS program, and (3) using the expertise and resources of the Governor's Office of Highway Safety. Injury prevention programs are coordinated with the Governor's Office of Highway Safety, the Tucson and Arizona SAFE KIDS Coalitions, as well as with community groups.

The State Office of EMS continues to monitor and (when applicable) participate in project activities.

EVALUATION: All project activities are kept on a master schedule. Project personnel meet on a regular basis to discuss progress and problems. Pretests, posttests, and student evaluations are administered for quality assurance and for improvement (if necessary) in teaching techniques.

EXPERIENCE TO DATE: Overall, the Arizona EMSC project has made excellent progress. Project personnel and coalition groups have participated in (or have scheduled) over 200 educational presentations, over 50 injury prevention programs, and 6 PALS courses, involving 100 EMS agencies, 1,000 emergency health care providers, 200 parents, and 10,000 children. Project investigators have conducted workshops at national injury control conferences and are members of key advisory committees that impact emergency medical services for children. Two additional grants were submitted (but not funded) and plans are underway for additional grant applications.

Colorado EMS for Children
Colorado Department of Health
Emergency Medical Services Division
EMSD ADM A3
4300 Cherry Creek Drive South
Denver, CO 80222-1530
(303) 692-2980
(303) 782-0904 fax

EMSC
MCH-084001
10/01/92–09/30/95
Project Director(s):
Michael Armacost

PROBLEM: The State of Colorado is faced with many challenges in developing a systems approach to pediatric prehospital care. Currently, specialized pediatric training programs are not available for prehospital care providers; this is especially true in rural Colorado. Children of minority and Native American populations are underserved by the emergency medical services (EMS) system. Intentional and unintentional injuries are the leading causes of death and disability among children in Colorado. Currently, no injury prevention program is available for prehospital providers interested in decreasing pediatric injuries.

GOALS AND OBJECTIVES: The Pediatric Emergency Care Committee of the Colorado Department of Health, EMS Division, has as a mission the overall reduction of childhood morbidity and mortality by establishing a system of emergency medical services for children (EMSC) in Colorado. The goals of the project are to:

1. Implement a pediatric emergency training program throughout Colorado, with emphasis on rural EMS agencies. Rural prehospital and hospital-based providers will be offered initial and continuing training in recognizing and stabilizing the seriously ill or injured child.
2. Establish a statewide network of emergency medical technicians (EMTs) to conduct community-based injury prevention, education, and public awareness efforts. Local EMT agencies will be provided resources to identify community needs in pediatric injury prevention, form injury prevention coalitions, and develop and disseminate intervention strategies.
3. Host a meeting of the Intermountain Regional EMSC Coordinating Council (IRECC) in Colorado in 1994 to ensure that current, past, and non-EMSC States continue to network and share resources.

METHODOLOGY: The pediatric emergency training methods will be as follows:

1. Computer-driven interactive videodisc (IVD) technology, as used by other EMSC projects, will be disseminated to rural transport agencies. The Pediatric Respiratory Emergencies software program will be offered the first year, supplemented concurrently by pediatric skills training in basic life support, patient assessment, and airway management. IVD programs on pediatric trauma and medical emergencies will be disseminated as they become available.
2. The 2-day course in pediatric prehospital care, adopted from the Oregon/Washington/Utah EMSC projects, will be offered to State training programs.
3. A course in pediatric vascular access, developed by the Utah EMSC project, will be offered to all EMT intermediates for both initial and continuing education.
4. Nurses providing emergency care will be encouraged to complete course work in pediatric emergency nursing care through one of two curriculums; the one presented by the Emergency Nurses Association and the Spring Hill Publishing Company's course on pediatric emergency nursing.

The injury prevention methods will be as follows:

1. An EMT-based injury prevention program will be established. EMSC staff will locate resource materials on injury prevention that are appropriate to Colorado.

2. An injury prevention/public information officer program will be developed. The injury prevention officer in each participating EMS agency will serve as the contact point to assist in forming SAFE KIDS coalitions, developing child safety seat loaner programs and working with the Department of Transportation and community leaders to help eliminate preventable morbidity and mortality among children.
3. Minority children, specifically Native American and children with special health needs, will be targeted for direct technical assistance in injury prevention. The Utah EMSC product *Two Worlds: A Calendar and Health Guide for Parents* will be adapted for and distributed to Colorado Indian populations.

In connection with goal 3, one IRECC meeting will be hosted in Colorado during year 2.

Coordination of all activities will be through the EMSC staff supervised by the State training coordinator with guidance from an executive committee of the Pediatric Emergency Care Committee.

EVALUATION: The interactive videodisc technology will be evaluated using a modified version of the Montana and Idaho EMSC projects. Student evaluations will be collected and analyzed. The total number of trained persons will be reported.

Student evaluations of the pediatric prehospital care course will be analyzed. The total number of trained personnel will be reported.

Student evaluations of the pediatric vascular access course will be collected and analyzed. State prehospital data forms will be used to document changing rates of successful pediatric vascular access skills. The total number of trained persons will be reported.

The number of facilities contacted for pediatric emergency training for nurses will be documented.

Data will be collected on the frequency of use of the national and State resources.

The number of EMTs recruited to coordinate injury prevention efforts in their community will be reported. Evaluation components specific to adopted programs will be used.

The number of calendars distributed will be documented.

The IRECC meeting during year 2 will be evaluated by all participants.

EXPERIENCE TO DATE: The project is currently at full staff, following unavoidable delays. The interactive videodisc training project began in the northwestern part of the State in February, following delays in the delivery of hardware. Two pediatric prehospital care instructor/trainer seminars will be presented by mid-June 1994 to prepare approximately 120 instructors from about 45 medical training facilities for course presentation. Curriculum materials will be distributed statewide to these centers. EMSC staff have participated in two Intermountain Regional EMSC Coordinating Council meetings and are planning on hosting one in September 1994; they also participated in the National EMSC/American Academy of Pediatrics/National Highway Traffic Safety Administration/American College of Emergency Physicians convention in March 1994. A number of injury prevention coalitions are progressing. In addition, 100 statewide EMS professionals attended one injury prevention coalition-building seminar. The *Two Worlds* calendar concept has been produced by the Southern Ute tribal council.

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EMSC
MCH-134001
10/01/93–09/30/95
Project Director(s):
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PROBLEM: Existing basic components of the emergency medical services for children (EMSC) system require specific actions and directions. Particular areas of concern include: (1) Fragmented data collection and analysis; (2) concentration of trained personnel and emergency department resources in a few geographic areas; (3) insufficient focus on the specific needs of children in the large emergency medical services (EMS); (4) limited quality assurance information; and (5) high prevalence of intentional and unintentional pediatric injuries. In addition, fundamental trauma system development issues, including emergency medical services for children, need to be addressed.

GOALS AND OBJECTIVES: The project has established the following goals and related objectives:

Goal 1: Provide tiered training to public safety officers, prehospital EMS personnel, primary health care providers, and emergency department and critical care personnel.

Objectives:

a. Enhance first-responder curriculums and training of 1,200 public safety officers;

b. Certify 1,200 prehospital providers in pediatric life support each year, concentrating on underserved regions;

c. Provide instructor programs in Pediatric Advanced Life Support (PALS) to increase the number of instructors and affiliate faculty and to provide PALS courses twice in each region;

d. Adapt a PALS enhancement course and provide it at least 90 times; and

e. Strengthen the abilities of primary health care providers to assess and manage pediatric critical care situations, and offer inservice training in all regions.

Goal 2: Impact community behavior by providing public information and education programs on injury prevention and the care of critically ill or injured children.

Objectives:

a. Establish a cadre of EMS injury prevention specialists to conduct 2,000 injury prevention presentations in community settings and train 10,000 people in bystander care and/or Pediatric Basic Life Support; and

b. Strengthen EMS community involvement with local injury prevention groups and focus attention on EMSC issues within these groups.

Goal 3: Build the capacity of the EMS system to address the needs of pediatric patients and evaluate system effectiveness.

Objectives:

a. Build support for EMSC activities;

b. Refine emergency department criteria and prehospital care protocols; and

c. Establish surveillance and quality improvement capacity.

METHODOLOGY: The Georgia EMSC (GEMSC) approach reflects Georgia's EMS structure and the level and types of activities now underway. Much of the GEMSC activity will be implemented by the 10 regional EMS offices. GEMSC strengthens existing entities and activities by establishing EMSC resource capacity in weak, predominantly rural areas, augmenting ongoing programs with expanded EMSC material, and delineating procedures for the needs of critically ill or injured children. These activities are combined with comprehensive, cohesive data collection and analysis to drive planning and policymaking.

Coordination of project activities occurs within the State's EMS office and is the responsibility of the project coordinator, who is assisted by a community program liaison and an administrative secretary.

EVALUATION: Process evaluation will track progress in the following areas: Adherence to workplans; product development; training; levels of field activity; implementation of studies and production of reports; promulgation of protocols, criteria, and guidelines; and enactment of regulatory and statutory change. Monitoring will be ongoing.

EXPERIENCE TO DATE: GEMSC has experienced pleasing success with the training of prehospital and inhospital personnel. A very enthusiastic medical advisory work group has developed PALS enhancements and continuing education modules for primary care providers and is reviewing emergency department criteria and prehospital protocols. Injury prevention and community education activities within the EMS community are growing.

Improving Emergency Medical Services for Children in Massachusetts

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EMSC
MCH-254001
10/01/92–09/30/95
Project Director(s):
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PROBLEM: Children differ from adults both physically and emotionally, and the treatment of critically ill or injured children must meet their unique needs. An illness or injury that may not be serious to an adult can have long-term impact on a child's physical and emotional well-being. Emergency medical services for children (EMSC), incorporating prehospital care, hospitalization, rehabilitation, and community followup, must take into consideration special needs

Approximately 1,420 children ages birth through 21 years die each year in Massachusetts. The majority of these deaths are in children under 1 year of age, who die from perinatal and medical conditions. Trauma is the leading cause of death in children older than 1 year of age, both nationwide and in Massachusetts. In 1990, 583 children ages 1–21 years died; 365 (62.6 percent) due to injuries, and 218 (37.4 percent) due to medical conditions. In that same year, 10,521 children were admitted to hospitals because of injuries. Until recently there was no organized statewide plan for providing emergency care for ill or injured children in Massachusetts. Gaps have been identified in the areas of system standards, training, data, access, and injury prevention.

GOAL AND OBJECTIVES: This project will improve and expand EMSC in Massachusetts, with the intent of integrating pediatric standards into a variety of services that will be sustained after the grant period. The overall goal of the project is to ensure the delivery of state-of-the-art emergency medical services (EMS) to all children in Massachusetts in a coordinated and efficient manner, in order to reduce mortality and morbidity resulting from illness or trauma.

The six project objectives are to:

1. Develop pediatric practice standards and policies and integrate them into the Massachusetts emergency medical services system;
2. Increase the level of knowledge and skill required among emergency medical personnel to care effectively for ill or injured children;
3. Improve the quality of hospital data that can be used to monitor the incidence and causes of nonfatal childhood injury hospitalizations;
4. Create a baseline for evaluating EMS system performance over time;
5. Reduce access barriers to EMS for all children in Massachusetts; and
6. Increase collaboration between EMS providers and injury prevention practitioners in statewide and community-based projects.

METHODOLOGY: Pediatric protocols and standardized ambulance equipment lists will be distributed to prehospital providers; and guidelines will be developed for aeromedical and interfacility transfer.

Pediatric curriculums will be developed for training emergency medical technician (EMT) instructors, paramedics, and emergency department nurses and physicians. EMT instructors will in turn impact 3,000 licensed EMTs across the State.

Through advocacy, education, and targeted site visits, the project will improve documentation of injury including external causes of injury (E) codes in hospital discharge records.

A study will be carried out to determine the extent of pediatric trauma regionalization within the current system.

The access barriers to EMS services, particularly among minorities, will be documented, and a plan will be developed to reduce these barriers. A brochure will be developed and a series of training programs for nurses will be conducted to link families of children with special health needs to available supportive and therapeutic services.

The project will target key EMS providers and injury prevention practitioners for activities designed to increase collaboration. Activities include a needs assessment, a seminar, a newsletter, and contracts for community projects.

Major EMS activity is being carried out by the Massachusetts Public Health Department, Office of Emergency Medical Services (OEMS), to revise and enhance emergency services in Massachusetts. The EMSC project is integrating all of its activities with those being carried out by OEMS through its "EMS 2000" initiative. In addition, the project has developed a number of its own working committees, which involve EMS providers and administrators from all regions of Massachusetts.

EVALUATION: Process measures will be used to monitor the progress of the six objectives to assess the impact of project activities on the EMS system. Every activity will be tracked by staff and reviewed by the steering committee. The trauma regionalization study will provide baseline data for comparing the system's performance before and after the EMSC initiative.

EXPERIENCE TO DATE: Project staff have been hired, and a steering committee meets on a regular basis. A statewide advisory council is being formed and will meet twice a year to give overall direction to the project. Progress has been achieved on the first three objectives. Eleven pediatric protocols have been written for prehospital providers, and planning is underway for training EMT instructors in pediatric emergency care. This training will include curriculum for new EMTs as well as refresher training for experienced EMTs. The training is being planned and evaluated by the Training Committee, which draws its membership from all regions of the State. The Public Health Department is producing a position paper in support of E coding of all hospital injury diagnoses and is working with the Massachusetts Hospital Association to report to hospitals on their progress with E coding.

Addressing the Emergency Medical Needs of Children in Minnesota

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EMSC
MCH-274001
10/01/93-09/30/95
Project Director(s):
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PROBLEM: The Minnesota Department of Health (MDH) recognizes that the special needs of children with serious trauma and illness challenge the organization, personnel, equipment, and facilities of emergency medical services (EMS) providers statewide. MDH does not have the funds and staff to study the statewide status of emergency medical services for children (EMSC) in Minnesota and to provide the needed resources and leadership based on the results of that study. The Minnesota EMS system lacks an ongoing, statewide, coordinated effort specifically focused to meet children's needs for emergency medical services. The system lacks standardized prehospital protocols and training in pediatric emergency care for prehospital personnel, as well as coordination of pediatric prehospital, hospital, and rehabilitation resources.

GOALS AND OBJECTIVES: The goals of the project are to:

1. Make pediatric emergency care training accessible to EMS prehospital providers statewide, emphasizing services for Minnesota's Native American population;
2. Conduct a retrospective study of pediatric ambulance run reports to identify special needs and to develop appropriate protocols for EMS providers;
3. Develop, modify, and distribute prehospital and interfacility emergency care triage, treatment, and transport protocols to ambulance services, using the findings of the retrospective study (goal 2);
4. Examine the pediatric emergency care resources of each of Minnesota's 149 acute care hospitals, and provide hospital-specific supplemental resource materials to enable each hospital to improve its emergency care and rehabilitation capabilities; and
5. Establish a pilot project using computer-driven interactive videodisc (IVD) technology in two regions.

Program objectives for the coming year are to:

1. Develop outcome criteria for regional retrospective studies on ambulance run data;
2. Develop a provider and instructor course curriculum based on a revised curriculum for the Pediatric Emergency Care course;
3. Complete contractual agreements for pediatric courses and regional data studies;
4. Measure the learner objectives;
5. Begin offering the course for instructor and provider training;
6. Produce final reports from the studies on ambulance run data;
7. Assimilate ambulance data reports into the pediatric emergency medical care triage, treatment, and transport protocols for prehospital personnel;
8. Develop, produce, and distribute prehospital and interfacility triage, treatment, and transport protocols;
9. Provide one instructor course for Indian reservations through a subcontract with the Bemidji Area Indian Health Service;

10. Develop criteria for and distribute to Minnesota's acute care hospitals a hospital self-study assessment booklet;
11. Create a review team for hospital assessment;
12. Develop resources for the hospital self-study assessment packet, and distribute packets;
13. Evaluate and replicate products and strategies developed in Minnesota for use in other States involved with EMSC activities;
14. Conduct and evaluate the IVD pilot project for potential statewide application;
15. Ensure inclusion of pediatric data in the State's trauma registry;
16. Establish and enhance linkages with other programs for the support of EMSC, and disseminate information regarding EMSC activities; and
17. Seek ongoing funding and program support to continue EMSC efforts.

METHODOLOGY: The project is being directed by MDH, Emergency Medical Services Section, which will provide leadership and technical support for the EMSC activities. The Steering Committee will serve as a resource for the EMSC coordinator and the commissioner of health by providing expertise and experience concerning EMSC policy and procedures. An instructor course in pediatric emergency care will be provided, and instructors from this program will then train providers in their regions. Minneapolis and St. Paul Children's Hospitals will be solicited to provide complete onsite pediatric emergency care internships for emergency medical technicians (EMTs). The regional ambulance run data report will be completed. In developing prehospital protocols, coordination will take place with the trauma grant, the ambulance data study, and the Traumatic Brain and Spinal Cord Registry in collaboration with members of the Minnesota Association of Emergency Physicians. The pediatric emergency care resources of Minnesota's 149 acute care hospitals will be assessed, and supplemental resource materials will be developed. The Virginia and California assessment programs for hospital pediatric emergency care will serve as models.

EVALUATION: All new program activities will be reviewed by the EMSC program and/or EMSC Steering Committee before implementation. Course evaluations as well as learner objective measurement tools will be summarized and reviewed, and adjustments will be made, as indicated by provider knowledge after each learning course module.

EXPERIENCE TO DATE: The postponed start of this project was due to a delay in hiring staff. However, efforts are now well underway, although 5 months behind the originally projected timeframe. The highlight of the past few months was the convening of the EMSC Steering Committee and the established work groups to take action immediately on the goals and objectives. Key personnel have participated in national and EMSC meetings to update the project objectives, and a pilot project to evaluate the effectiveness of IVD technology in Minnesota has been added. The EMSC coordinator is establishing contacts with many organizations to gain visibility and support for EMSC in the State.

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EMSC
MCJ-344001
10/01/91–03/31/95
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PROBLEM: This project addresses the fragmented provision of pediatric emergency medical services in New Jersey, in order to fully define the problem and to develop a focused approach for remediation. New Jersey is the Nation's most densely populated State, but has many urban, suburban, and quasi-rural areas within its boundaries. According to the 1990 census, children comprise 23 percent of the population (7,730,188). As a shoreline "corridor State," New Jersey also has many travelers and visitors.

GOALS AND OBJECTIVES: The goals of this project are to:

1. Support public information programs to prevent pediatric emergencies;
2. Establish linkages with other programs to disseminate information to families of children in special populations (special health needs, minority, and/or low income);
3. Replicate pediatric emergency medical services (EMS) educational programs for prehospital basic and advanced life support providers, and emergency department physicians and nurses;
4. Support advisory groups of specialists in pediatrics and emergency medical services who will work collaboratively on pressing issues and identify problems in the delivery of pediatric EMS care; and
5. Identify and enhance appropriate pediatric data bases.

Program objectives in the coming year are to:

1. Support public information programs to prevent pediatric emergencies;
2. Use linkages with Special Child Health Services and other groups to disseminate information to families of children with special health needs, and work with programs that serve minority children, such as the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), developing plans to incorporate program features into appropriate activities;
3. Train instructors in emergency medical services for children (EMSC) prehospital courses in basic and advanced life support, replicate programs for physicians and nurses, and train appropriate instructors;
4. Support advisory groups of specialists in pediatric care and EMS who will work to promote pediatric patient care standards and participate in and publish related research;
5. Ensure that pediatric data are included in the State's trauma registry;
6. Form an EMSC Advisory Council, as mandated by law;
7. Seek ongoing funding and program support to continue EMSC efforts;
8. Support statewide dissemination of the high school prevention component of the Think First Program/Head and Spinal Cord Injury Prevention Program;
9. Develop a pediatric injury prevention program which can be presented in the community by EMS providers;

10. Develop a comprehensive statewide EMSC data base to monitor and analyze related activities and trends; and
11. Develop online computer capability with MCH-Net.

METHODOLOGY: The project is being directed by the Department of Health's Office of Emergency Medical Services. Three subcontracts have been awarded in the areas of training, pediatric illness, and pediatric trauma. Each part of the project addresses a particular problem area. The EMSC program is replicating the ChUMS program (University of New Mexico EMSC project) as a pilot for 1 year to determine feasibility for statewide implementation. Basic and advanced prehospital life support courses will be replicated from the North Carolina EMSC project. The Advanced Pediatric Life Support course (an American College of Emergency Physicians course) will be offered for the first time in New Jersey. Pediatric injury prevention will be addressed using two approaches: (1) A course will be offered for adults at community gatherings, through the State's emergency medical technician network; and (2) a program will be taught in junior and senior high schools by educators from designated trauma centers and nearby rehabilitation facilities.

Coordination of activities in the three subcontracts is being directed by the Office of Emergency Medical Services. The office works with other programs within the Department of Health, such as Health Promotion/Disease Prevention, Special Child Health Services, and WIC, works with the Department of Human Services, and anticipates cooperative programs with the Division of Highway Traffic Safety. Additionally, the Office of Emergency Medical Services is involved with SAFE KIDS on the State and focus track levels, and with the Sudden Infant Death Syndrome (SIDS) Resource Center.

EVALUATION: Each subcontract contains criteria for evaluation. Progress is monitored by site visits and by written reports submitted quarterly. All new program activities will be revised by the EMSC program and/or EMSC Advisory Council prior to implementation. Course evaluations will be reviewed and program adjustments will be made as indicated.

EXPERIENCE TO DATE: There were early delays in setting up funds, awarding the subcontracts, and hiring the program manager. Despite these delays, efforts are well underway, although the project is still about 9 months behind its original timeframe. The highlight of the past year was the passage of New Jersey's law concerning emergency medical services for children, the first such legislation in the country.

Development of new curriculums for both basic and advanced prehospital providers proved too cumbersome, so replication of North Carolina EMSC project's prehospital programs will be substituted, once New Jersey's critical illness and trauma protocols (currently being developed) have been approved. The trauma subcontractor hired a full-time coordinator and is progressing rapidly in areas of pediatric trauma protocols, trauma data analysis, and education. The original activities of the pediatric illness subcontractor will be nearly completed by early fall.

The ChUMS project was presented to an ad hoc committee, and limited implementation of this program was determined to be most practical; a 1-year pilot program will be used to evaluate its effectiveness in New Jersey.

In addition, the EMSC program manager has worked with many organizations to gain visibility and support for EMSC in the State.

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EMSC
MCH-424001
10/01/94–09/30/96
Project Director(s):
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PROBLEM: The Division of Emergency Medical Services Systems, Pennsylvania Department of Health, needs an organized advisory body that can focus its attention on prehospital care for pediatric patients. Many health care providers and educators would like to have greater opportunities for education about pediatric prehospital care. Those wishing to improve the system as well as those wishing to provide educational programs are hindered by the lack of epidemiologic data on the current needs for pediatric prehospital care in Pennsylvania. Those wishing to conduct injury prevention projects need centralized, readily accessible resources including information on safety issues and information regarding the methods and needs to be addressed in order to most effectively reach the targeted population.

GOALS AND OBJECTIVES: The project goals are to initiate and develop a continuing process for:

1. Using available expertise to advise the Department of Health and other organizations on issues related to emergency medical services for children (EMSC);
2. Conducting a needs assessment concerning EMSC and establishing a system for doing so in an ongoing fashion;
3. Providing educational programs and materials on pediatric emergency care to prehospital providers; and
4. Linking those who are providing education in pediatric injury prevention with available resources in pediatric injury prevention.

The project objectives are to:

1. Establish an EMSC advisory committee within the emergency medical services (EMS) system in Pennsylvania, through the Pennsylvania Emergency Health Services Council (the advisory body of the Division of EMS Systems);
2. Establish an EMSC data base linking data from the EMS trip report form and other data bases related to EMSC in Pennsylvania;
3. Use the trip report form data base and information from all other available data bases for EMSC needs assessment;
4. Assess the need for pediatric emergency care training through different types of surveys;
5. Provide pediatric educational programs to prehospital providers by using available training programs and materials;
6. Provide limited funds to Heart Association affiliates with the specific purpose of enhancing the pediatric advanced life support (PALS) program in underserved areas;
7. Enhance the pediatric educational component at the State annual EMS conference; and
8. Establish an office for pediatric injury prevention resources in Pennsylvania.

METHODOLOGY: The project will:

1. Solicit representatives to the EMSC Committee from among the Pennsylvania Emergency Health Services Council member organizations, other organizations, the pediatric community, and the public;
2. Form several subcommittees with expertise on each task group to address specific needs as identified;
3. Conduct a needs assessment, including intensive reviews on selected calls, by using the statewide EMS trip report form data base;
4. Identify data bases—including the Pennsylvania EMS trip sheet data base, Pennsylvania Trauma System Foundation trauma registry data base, emergency department discharge data base, hospital discharge data base, data from the Fatal Accident Reporting System (FARS), and the Department of Transportation crash data base—for linkage to the EMSC data base;
5. Purchase software and seek technical assistance to facilitate linkage of data bases;
6. Maintain a registry on the number of prehospital providers enrolled in pediatric training programs;
7. Survey paramedics and emergency medical technicians (EMTs) regarding EMSC training needs;
8. Provide funds to certain training entities to continue training programs in pediatric emergency care;
9. Offer pediatric emergency care lectures and hands-on sessions at the State annual EMS conference;
10. Develop a pediatric injury prevention and control curriculum for school-aged students with organizations including the American Medical Student Association;
11. Obtain and purchase selected pediatric prehospital care programs for distribution to each of the 16 regional EMS councils in Pennsylvania;
12. Employ an EMSC project coordinator, a prevention specialist, and a clerical staff;
13. Establish a toll-free number for the public at the injury prevention office;
14. Publish a quarterly newsletter on pediatric injury prevention and other EMSC issues; and
15. Gain access to available EMSC computer networks.

EVALUATION: The Department of Health will review recommendations submitted by the Pennsylvania Emergency Health Services Council's EMSC Advisory Committee.

Pennsylvania Emergency Health Services Council staff will conduct a survey to assess the awareness of the availability and roles of the EMSC Advisory Committee.

The reports on methodology and test linkages on data bases will be reviewed by the EMSC Advisory Committee by the end of year 1.

Reports on needs assessment, including data analyses and survey results, will be given to the EMSC Advisory Committee for review.

Pennsylvania Emergency Health Services Council staff will conduct evaluations on the lectures and hands-on sessions related to EMSC given at the State annual EMS conference.

The EMSC project staff will conduct a survey to assess the awareness and function of the injury prevention resources office.

By the end of year 1, the EMSC project staff and their work group will be able to identify injury prevention programs for school-age students and particular needs within Pennsylvania.

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EMSC
MCH-444001
10/01/93–09/30/95
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PROBLEM: Although 1,617 children were hospitalized because of injuries in Rhode Island during 1990, current instructional programs for emergency medical technicians (EMTs) in Rhode Island are oriented toward the needs of adult patients and do not take into account the significant physiological and emotional differences involved in treating critically ill or injured children.

Children and families with limited English proficiency are particularly vulnerable to medical emergencies as a result of language and cultural barriers and parents' unfamiliarity with the health care delivery system. The 1990 census identified Southeast Asian and Spanish-speaking residents as the fastest growing population groups in the State; these families are likely to experience difficulties in identifying emergency situations, providing basic first aid until rescue personnel arrive, and accessing timely and appropriate care for injured or critically ill children, because existing injury prevention and health promotion initiatives are geared to the needs of English-speaking families.

To improve the quality of care for all injured children in Rhode Island, new pediatric care protocols must be implemented for all levels of practice in emergency medical services (EMS). In addition, efforts must be undertaken to expand coverage of pediatric emergencies in basic EMT training courses at each level of practice and to increase opportunities for continuing education in the management of pediatric emergencies.

GOALS AND OBJECTIVES: The Department of Health proposes to increase the years of healthy life for Rhode Island's children by developing a comprehensive education and training program to improve the capabilities of EMS providers and expand childhood injury prevention efforts. The Department of Health will seek to achieve two principal goals: (1) Providing training to EMS personnel that is specifically tailored to the needs of children, and (2) developing culturally sensitive parent education materials tailored to the needs of Southeast Asian and Latino families.

METHODOLOGY: The Department of Health's emergency medical services for children (EMSC) initiative will provide expanded training in the treatment of pediatric injuries to more than 1,000 EMTs statewide through a combination of new educational programs. Training courses for basic-level (EMT-A) and intermediate-level (EMT-C) prehospital personnel will be augmented to include a significant pediatric component. Since these changes will be included as part of the basic curriculum for both programs in subsequent years, expanded pediatric training will ultimately become available to the majority of the State's prehospital providers through basic instruction or continuing education programs. In addition, during project years 1 and 2, the Department of Health will offer courses in basic trauma life support (BTLS) and Pediatric Advanced Life Support (PALS), as well as seminars on pediatric injuries throughout the State.

Materials developed by other EMSC grantees (e.g., New York, North Carolina, Washington) will be incorporated into the Department of Health's EMT pediatric training programs, along with existing curriculums from the American Heart Association's PALS course and the American College of Emergency Physicians' BTLS program. Prior to training, the EMS training coordinator and the medical consultant to the Division of Emergency Medical Services will review the Department of Health's recently revised pediatric care protocols and expand the coverage of pediatric emergencies in the State's basic (EMT–A) and cardiac (EMT–C) training programs for prehospital personnel.

Parent education materials developed by other EMSC grantees (e.g., New Mexico, Oregon, Florida) will be evaluated for their appropriateness for Spanish-speaking and Southeast Asian audiences. Community agencies will assist in identifying members of the Southeast Asian and Latino communities in Rhode Island to be trained as parent educators.

The first-year budget of $248,754 will fund three new staff positions in the Division of EMS to manage and implement program goals, establish contracts with one or more community agencies to conduct parent education sessions, and retain the services of translators to help create educational materials in several languages (including Cambodian, Hmong, Lao, Thai, and Vietnamese). In addition, the Department of Health will contract with the American Heart Association to conduct a series of PALS courses for EMS personnel throughout the State. Sufficient funds are also budgeted for required travel, training equipment, supplies, and the indirect costs associated with project activities. The project will be administered by the chief of EMS with support from the department's Injury Prevention Program and the Trauma Care Systems Project. The implementation of this project will significantly improve the delivery of EMS for the State's children by expanding educational opportunities for providers and parents.

EVALUATION: EMT training programs will be evaluated by a comparison of the adequacy of prehospital care for pediatric patients before and after completion of training programs. In addition, each training course will include a written pretest and written and practical skills tests to measure the effectiveness of the Department of Health's expanded pediatric training activities.

Community agencies that contract with the Department of Health to provide parent education courses for populations with limited English proficiency will administer standardized pretests and posttests to all participants.

EXPERIENCE TO DATE: Anticipated progress has not matched the original project schedule due to the delay in the start of activity secondary to funding and personnel issues. However, the project has hired a program manager and initiated activities to meet our stated objectives. Our EMSC Prehospital Task Force, in cooperation with the Rhode Island Ambulance Service Advisory Board, has drafted pediatric protocols for prehospital providers and prepared draft revisions of the minimum equipment list for ambulances (to include required and recommended supplies for the care of pediatric patients). Data collection has been initiated using an automated prehospital report form. A review of educational programs developed by previous EMSC grantees has been conducted for eventual implementation and integration into existing EMT training programs. Key personnel have participated in national EMS and EMSC meetings to update the project objectives and maintain contacts with other EMSC programs.

Regionalization of Care for Pediatric Patients
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EMSC
MCH-454001
10/01/94–09/30/96
Project Director(s):
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PROBLEM: South Carolina's demographics and prehospital emergency medical care data illustrate a pediatric population at high risk for mortality and morbidity from childhood injury, trauma, and illness. South Carolina ranks 19th in the Nation in the percentage of population under 18 years of age (26.4 percent). South Carolina ranks 11th in the Nation in motor vehicle crash deaths per 100,000 population and 6th in the Nation for its violent crime rate per 100,000 population. Prehospital ambulance run data have shown that rural areas and areas with higher poverty rates have the highest percentage of pediatric ambulance runs. A preliminary survey indicates that these areas lag behind other regions of the State in prehospital pediatric specialty training. Compounding the problem is the fact that many of these rural areas are not covered by hospitals participating in South Carolina's current trauma system.

GOALS AND OBJECTIVES: The goal is to reduce the mortality and morbidity of pediatric medical and trauma patients in the Low Country and Pee Dee regions of the State by improving the system of care for the pediatric patient.

The objectives are to:

1. Increase pediatric training for personnel in prehospital EMS and rural hospitals in the Low Country and Pee Dee regions;
2. Establish regional systems for pediatric emergency care by developing plans and protocols for treatment and referral to designated facilities with special capabilities;
3. Develop an injury surveillance system for prehospital and hospital data collection that would capture all pediatric injuries and illnesses;
4. Using the data collected through the surveillance system, complete an analysis designed to determine continuing system problems, suggest changes to improve the statewide system for pediatric care, encourage and support legislation to prevent childhood injuries, and develop long-range objectives to upgrade the current EMS system by integrating policies and protocols that address the needs of pediatric patients; and
5. Develop educational programs for the public regarding how to access the EMS system and prevent injuries.

METHODOLOGY: The South Carolina Department of Health and Environmental Control (DHEC), Division of Emergency Medical Services (EMS), headquartered in Columbia, SC, is the lead agency responsible for administering EMS and will administer the project. DHEC has four deputyship areas; the Division of EMS is a division of the Bureau of Health Facilities Regulations, which is a subcomponent of the Health Regulation Deputyship of DHEC. The University of South Carolina School of Medicine and the Medical University of South Carolina have agreed to assist DHEC in directing the activities of the project.

With the assistance of assessment tools and model protocols developed in earlier projects related to EMS for children (EMSC), South Carolina will transform its current prehospital and hospital system into an integrated system for adult and pediatric emergency care, beginning with two targeted EMS regions. EMSC development activities will be guided by a multidisciplinary committee with special expertise in EMS and pediatric medical care. The Division of EMS will begin its activities by establishing more definitive pediatric injury and illness baseline data and determining where gaps in data exist. To supplement current data systems, a

method will be developed to capture information regarding pediatric patients who are treated and released from emergency departments in targeted hospitals. This information, currently not available, will provide a more complete picture of regional pediatric injuries and illnesses. The data retrieved from all these sources will be used to adapt EMS systems and prehospital and hospital training needs and to develop public education programs addressing system access and injury prevention. Initial grant activities will also include evaluation and assessment of prehospital and hospital training, manpower, equipment, and facility resources. Once the assessments are complete, additional pediatric training, including the development of a preceptorship program provided by the schools of medicine, will be offered to prehospital and hospital personnel. Pediatric treatment and transfer protocols will be developed on the basis of the results of the assessments and earlier EMSC project models.

EVALUATION: Currently, data on pediatric injuries and illnesses are available from two sources within the Division of EMS—the ambulance run report, and the statewide trauma registry. These sources provide information on demographics, cause of injury, severity of injury, treatment procedures, and outcome measures. Data are also available for evaluation from the Division of Vital Records (cause of death) and hospital discharge data. These resources, plus information gathered from the targeted emergency departments during the grant, will provide a monitoring tool for evaluation of training and regionalization outcomes and injury prevention activities as the grant is completed. Evaluation will also include analysis of the results from each of the specific objectives of this project.

South Dakota Emergency Medical Services for Children Implementation Project
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EMSC
MCH-464001
10/01/93–09/30/95
Project Director(s):
Stephen R. Karl, M.D.

PROBLEM: South Dakota is a large, sparsely populated State with three distinct populations. There are few pediatric specialists and no specific pediatric provisions in the existing emergency medical services (EMS) system. The State childhood death and injury rates exceed those of the United States as a whole.

GOALS AND OBJECTIVES: The goals of the project are to:

1. Determine the pediatric capabilities of the current EMS system;
2. Evaluate the outcome and services provided to acutely ill and injured children;
3. Target prehospital and inhospital providers with broad-based educational programs; and
4. Focus an aggressive public information and education effort on injury prevention and accessing EMS.

METHODOLOGY: Equipment and training resources of ambulance services and emergency rooms will be evaluated by questionnaire.

All ambulance run forms for pediatric patients will be monitored.

Five sentinel illnesses and injuries will be chosen and followed in the four major hospitals in the State.

All pediatric admissions to the two trauma programs will be identified and followed using the trauma registries.

Emergency medical technicians (EMTs) will receive training in an appropriate pediatric course.

Paramedics and physicians will be offered the Advanced Pediatric Life Support (APLS) course.

The North Carolina emergency room course will be given via teleconference to the pediatric, critical care, and emergency nurses. This will be followed by the ENPC program given by the Emergency Nurses Association.

The course Planning to Avoid Childhood Emergencies will be taught by local ambulance services.

Use of bicycle helmets will be evaluated.

A head-injury prevention program stressing use of bicycle helmets will be held.

Public information will be provided for all regions, explaining how to access the EMS system.

EVALUATION: Equipment and training resources of ambulance services and emergency rooms will be evaluated by questionnaire at the end of each year to monitor progress.

All patient-related data will be analyzed for trends.

All ambulance services will be offered at least one course by the end of the first year.

The APLS and pediatric emergency nursing program will be evaluated by course attendance.

All pediatric deaths in the State will be evaluated.

Bicycle helmet use will be monitored for increased compliance.

EXPERIENCE TO DATE: Great difficulty has been encountered in hiring personnel. The project manager position was offered to and verbally accepted by someone who was experienced in EMS for children but who later decided to decline the offer. This caused a 3-month delay. A project manager has been hired and will start on June 6. Instructor applicants will be interviewed in June. An excellent working relationship has been established with the State EMS office. The principal investigator has been named to the State EMS Task Force and the State Disability Prevention Advisory Body. The principal investigator has met with and obtained the support and involvement of the State EMT Association, Tribal EMS Association, American College of Emergency Physicians, American College of Surgeons, American Academy of Pediatrics, Association of Family Physicians, Emergency Nurses Association, and the American Hospital Association.

Tennessee EMSC State Systems Implementation Grant
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EMSC
MCH-474001
10/01/94–09/30/96
Project Director(s):
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PROBLEM: Although there are many sporadic independent efforts aimed at improving emergency medical services for children (EMSC), no EMSC system exists in Tennessee. In this project, the State Subcommittee for Pediatric Emergency Care will implement (1) a system of statewide training for providers and the public, and (2) regionalization of emergency care. For impact analysis we have selected three areas that are representative of the statewide population in regard to ethnic and economic distribution, geography, and the number of pediatric emergency cases per year.

GOALS AND OBJECTIVES: This statewide project's three major goals are to:

1. Develop an EMSC system;
2. Increase the knowledge base of prehospital and community hospital emergency department personnel in pediatric emergency care; and
3. Implement a public education campaign to improve safety-oriented practices.

METHODOLOGY: The three goals are to be realized through eight specific aims:

1. Implement data collection in the target counties by the end of year 1, using a modified data set recommended by the Institute of Medicine. The information requested permits us to follow the care of a particular patient from the time a call is initiated to disposition from the local emergency department. Summaries of the aggregate data will be made available to the participating hospitals and services for their use in continuous quality improvement.
2. Create a statewide EMSC data collection system by the end of year 2 by institutionalizing the data set.
3. In year 2, convene two consensus panels to create a classification system for the pediatric emergency and critical care capabilities of health care facilities and to generate destination guidelines (triage and transfer) based on patient acuity and the classification system.
4. Facilitate ongoing communication with prehospital and hospital providers throughout the State by publishing an EMSC newsletter and establishing an electronic bulletin board by the middle of year 1.
5. Establish community links for public awareness efforts during year 1. We plan to generate at least two public awareness segments per year in each local broadcast and newspaper in the study regions during the 2 years of this grant.
6. By the end of year 2, document the impact of the public awareness campaigns by performing parking lot surveys of compliance with safety regulations such as child restraint use.
7. Using the existing State community college system, develop a statewide corps of instructors who can teach the *modified* North Carolina EMSC curriculum and produce a set of teaching videotapes by the ninth month of year 1.
8. Train 30 percent of the prehospital and hospital providers in the emergency management of children by the end of year 1 and 80 percent by the end of year 2.

Institutionalizing the EMSC program in Tennessee beyond the grant period will be accomplished in several ways. The data collection process will be formalized by the State bodies that regulate hospital emergency departments and prehospital services. The training component will be self-perpetuating through the existing community college system. The public awareness campaigns will continue through the efforts of local organizations recruited during this grant. The State Subcommittee for Pediatric Emergency Care will seek a permanent financing mechanism for its oversight responsibilities by working with State EMS and MCH staff. Lessons learned from studying the impact of our activities in the target areas will permit further development of statewide provider and public educational initiatives and also permit the formation of an EMSC infrastructure in Tennessee.

Tri-State Appalachian Alliance for Emergency Services for Children
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EMSC
MCH-544001
10/01/92–09/30/95
Project Director(s):
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PROBLEM: This project is a joint effort of Kentucky and West Virginia (with assistance from Ohio) to address the provision of emergency medical services for children (EMSC) in an isolated rural environment. Geographic isolation due to terrain and weather, low socioeconomic status, generally poor health in the study area, and high patient-to-physician ratios are some of the problems that exist in Appalachia. We are assessing the current status of our EMSC system and addressing barriers to the delivery of consistent, quality EMSC in rural Appalachia.

GOALS AND OBJECTIVES: The seven initial goals of the project are to:

1. Identify the special problems of EMSC in rural Appalachia;
2. Develop rural EMSC training programs and a continuing education curriculum;
3. Integrate pediatric practitioners into the emergency medical services (EMS) system;
4. Assemble statewide pediatric advisory committees to assist EMS squads and advisory councils;
5. Build community expertise in EMSC education in rural counties to lay the foundation for sustainable development;
6. Develop community interest in child injury prevention programs; and
7. Address the needs of children with special health needs in the EMS system.

METHODOLOGY: The Appalachian Alliance for EMSC consists of triads (representing various government agencies and health and service organizations within the three States) with a common concern for children in the EMS system. These triads have met to establish communication patterns. Epidemiological studies such as "sentinel case studies" (reviews of significant pediatric EMS and emergency department cases) and "pin-in-the-map simulations" are being performed to help determine the needs of the EMSC system. In addition, needs assessment surveys are being performed in selected areas, and statistics on pediatric admissions to emergency departments are being compiled.

Consensus guidelines on EMSC training and continuing medical education are being developed, beginning with local squads involved in the focus group process and extending to various government and provider triads.

Local pediatricians are becoming involved in training efforts, and State pediatric advisory committees are meeting regularly.

PATCH groups or similar organizations in various counties have been actively sought out as the focal point for community support for EMS systems and for childhood injury prevention projects. The Ohio EMSC project team has participated in the transfer of relevant techniques and methods developed through their project. The focus group and nominal group processes, designed to foster community involvement, have been employed with initial success.

The medical passport system is being investigated in the Appalachian setting.

This project works with State health agencies (including EMS, maternal and child health, and children with special health needs) in Kentucky, West Virginia, and Ohio, and with organizations such as the American College of Emergency Physicians and the American Academy of Pediatrics to facilitate communication. At the local level, pediatric injury prevention education is promoted by approaching county health departments to access the community health network. The process is initiated by holding community focus groups to determine needs and foster interest in childhood injury prevention.

EVALUATION: Baseline data are being gathered initially in the following areas: Status of the local system; training of emergency medical technicians (EMTs); staffing of emergency department; pediatric EMS equipment; linkages of the emergency medical services system, emergency departments, and referral centers; public information and education; and safety programs. These components will be monitored and reassessed periodically and at the end of the project, with special attention to sustainability of the advances. Differences in outcome from the sentinel case studies and pin-in-the-map simulations (to be repeated in year 3, after instituting the community-based training efforts) will also be used to evaluate the training efficacy. The medical passport system for children with special health needs will be evaluated by determining parents' perceptions of ease of access to the EMSC system.

EXPERIENCE TO DATE: Action groups are formulating guidelines for region-specific criteria for pediatric prehospital training and resources, emergency department training, continuing education, and personnel and resource standards. The North Carolina EMSC project's prehospital training curriculum has been used for local community EMSC training. A curriculum for nurses, EMTs, and paramedics has been developed for externships at pediatric tertiary care centers. Community and EMS focus groups have been held in several areas to begin local initiatives. These focus groups have identified child abuse and parenting skills as areas of major concern in addition to our previously identified problem areas. Prehospital providers have identified training of our Appalachian EMS personnel, who are mostly volunteer, as their most important priority through the pin-in-the-map studies and the focus group interviews.

ENHANCEMENT GRANTS

EMS for Children Enhancement Project
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EMSC
MCH-024002
10/01/94–09/30/96
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PROBLEM: A high rate of childhood injury in Alaska is confirmed by epidemiological studies. *Childhood Injury, State by State Mortality Facts*, a study by the Johns Hopkins Injury Prevention Center, rated Alaska as the State with the highest childhood injury death rate for children ages 0–14; a rate of 35 per 100,000 per year versus the national average of 19 per 100,000 per year. A 10-year study of deaths in Alaska from 1980 to 1989 by the Alaska Section of Epidemiology found that 84 percent of deaths among children and youth ages 5–19 were the result of injury.

In addition, a study of Anchorage hospitals in 1990 revealed that for every childhood injury death 40 children were hospitalized with injuries and 984 children were treated in emergency departments. This study indicates that children hospitalized with injuries are the "tip of the iceberg" of the total childhood injury picture.

A closer look at childhood injuries in Alaska reveals patterns, trends, and unusually high rates for specific types of injuries among specific age groups in certain regions. Significantly, specific types of injury deaths among certain age groups of children have decreased in Alaska in recent years, while others have increased.

GOALS AND OBJECTIVES: The goal of this project is to implement effective childhood injury prevention strategies among children at greatest risk for specific injuries as identified through the Alaska Trauma Registry and by injury fatality records.

The objectives are to:

1. Determine what types of childhood injuries in certain Alaskan regions are increasing in severity or frequency, or are continuing to occur at a significantly higher rate than the national average for each age group;
2. Identify an effective childhood injury prevention program (or develop one, if none exists) for each type of injury identified by the serious injury and mortality data for the targeted population of children at greatest risk of specific injuries within certain Alaskan regions;
3. Adapt the identified effective injury prevention program for each age group targeted within a region, and implement a program using persons knowledgeable in injury prevention strategies, including emergency medical services (EMS) providers in each region;
4. Increase the number of EMS providers trained to implement injury prevention programs in each targeted region; and
5. By 1996, decrease by 50 percent the number of serious injuries and injury fatalities in the regions receiving injury prevention programs for the age groups identified at greatest risk of injury.

METHODOLOGY: The Alaska State EMS Section, Division of Public Health, Department of Health and Social Services, is based in Juneau, AK, and consists of eight professional and two support staff.

Alaska EMS Section staff will analyze data on childhood injuries in Alaska to determine patterns of hospitalized injuries for various age groups of children; rates of injury; and types, circumstances, and seriousness of injuries in State regions. Staff will then gather relevant injury prevention materials and information about activities developed by other EMSC projects and national or international resources. Where no relevant or effective injury prevention materials or strategies exist, staff will work with other State agencies, EMS personnel, and community members to develop them. Once materials and strategies are available, injury prevention training will be provided to local EMS personnel, who in turn will work with other health care providers, teachers, and child care providers in their regions to implement injury prevention projects developed specifically for targeted populations.

EVALUATION: The Alaska Trauma Registry coordinator will obtain and analyze data regarding specific injuries targeted in each region where a project is implemented. In addition, each project will gather baseline data for the region targeted and will be responsible for monitoring the results of project activities.

Maryland Systems Enhancement for EMSC Programs
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EMSC
MCH-244002
10/01/94–09/30/96
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PROBLEM: Maryland's emergency medical services (EMS) system already includes a pediatric trauma system, a neonatal transport program, and specialty care components (burn, cardiac, eye, hand, hyperbaric medicine, neurotrauma, and high-risk perinatal). These components are all part of the State-funded Maryland Institute for Emergency Medical Services Systems (MIEMSS). MIEMSS is responsible for the designation of trauma and specialty centers; the training certification of more than 31,000 prehospital providers; the operation of a statewide EMS communications system; and the coordination of transportation, planning, and system evaluation. The addition of an emergency medical services for children (EMSC) component to address life-threatening illnesses in children is a much-needed evolution of the EMS system and one that can be easily integrated into existing structure.

GOALS AND OBJECTIVES: Goals and objectives are to:

1. Create a forum for ongoing communication to identify issues related to pediatric emergency care services and the strengths and weaknesses within each of the five EMS regions and the State of Maryland.

   Objectives:

   a. Establish, in each of Maryland's five EMS regions, a pediatric advisory committee consisting of professional and community members with a strong commitment to emergency care for children. These committees will be chaired by the regional pediatric emergency medical directors.

   b. Assess regional resources and strengths, including educational programs that are successful; potential pediatric faculty; injury prevention activities for children and families; quality management systems; available data on childhood illness and injury in each prehospital jurisdiction; and emergency departments.

   c. Identify and prioritize current issues in the delivery of quality pediatric EMS care along the continuum in each of the five regions. Delineate common issues and problems among regions as well as the unique issues within a specific region and/or jurisdiction.

2. Define the pediatric capabilities of emergency departments in each of the five EMS regions, including professional resources, education, quality improvement, data bases and data management systems, and reevaluate the equipment and pharmacological resources surveyed in the first Maryland EMSC grant period.

   Objectives:

   a. Establish a steering group to select the emergency department survey tool on the basis of the experiences of other EMSC grant projects and recommend the format for the survey to be conducted in Maryland. Survey all 49 emergency departments in Maryland.

   b. Review the existing guidelines for pediatric emergency care along the continuum and, with the steering group, develop pediatric guidelines for review in each of the five EMS regions. Guidelines will include prehospital basic life support and advanced life support equipment, emergency department equipment, a

prehospital pediatric emergency triage system, pediatric education and training for both prehospital and hospital professionals, emergency department personnel resources for all levels of pediatric commitment, and public education programs directed toward children and families.

c. Make available, in year 2 of the project, resources and guidelines for pediatric capabilities for emergency departments through the MIEMSS Office of Children's Programs. It is anticipated that the identification of facilities appropriate for pediatrics on a regional and statewide basis will begin during year 2 of the grant period and continue within the overall mandate of MIEMSS.

METHODOLOGY: The processes of delineating the needs for pediatric emergency care and then translating them to a statewide enhancement program have been facilitated by the appointment of the Pediatric Emergency Medical Directors Advisory Group. This Advisory Group has had organizational meetings and consists of designated leaders in pediatric emergency care in all five regions of the State EMS system. Advisory Group members have been actively involved in the planning and development of this enhancement project. The Advisory Group has identified the need to establish pediatric guidelines for emergency care in the prehospital and hospital environments. The members also plan to form regional pediatric committees that will be interdisciplinary and reflect the specific issues in each region. The last component of the project is to formulate and distribute a comprehensive survey of current pediatric EMS to the 49 emergency departments throughout the State of Maryland.

EVALUATION: The material from the survey will be collated and analyzed by the Pediatric Emergency Medical Directors Advisory Group. This survey will be used as a baseline to implement programs for identifying emergency departments that are appropriate for pediatric emergency care (so-called EDAPs) throughout the State. Furthermore, this information will be used to enhance educational programs and to help establish appropriate standards for care, including facilities, personnel resources, prehospital triage, and equipment for emergency care for children with life-threatening illnesses and injuries throughout the State.

Enhancement of Michigan Pediatric Emergency Development System

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EMSC
MCH-264002
10/01/94–09/30/96
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PROBLEM: The Michigan Department of Public Health (MDPH), Division of Emergency Medical Services (EMS), has statutory authority for the development of the prehospital emergency medical service system in the State. Current legislation provides the Division of EMS with the authority to plan, evaluate, and regulate the prehospital care system, license all levels of prehospital care providers and personnel, and establish local MCAs and patient care protocols.

Under the provisions of the act, hospitals within each MCA region are required to establish systems whereby quality of and access to prehospital care are developed through local treatment protocols (based on State guidelines). These guidelines include prehospital treatment, triage, communications, and transportation criteria. The division approves these systems and protocols. MCAs monitor these activities through a quality assurance process.

The Division of EMS is also responsible for the development of an inventory program that identifies hospitals that have specialty care capability and those that meet applicable Federal and State standards for trauma designation, and for the development of categorization criteria for emergency departments.

The division is divided into three sections—Personnel, Operations, and Trauma. The structural organization of the Division of EMS, which encompasses a combination of centralized authority and delegated local enforcement, is an ideal model for the implementation of innovations and improvements in the system.

GOALS AND OBJECTIVES: The short-term goal of the project is to develop and pilot a system of emergency medical services for children (EMSC) in three rural northern Michigan MCAs that have limited access to pediatric specialty and critical care. The long-term goal is to implement the pilot project throughout Michigan, forming a statewide EMSC system that provides optimal pediatric emergency care.

The objectives are to:

1. Develop standards for prehospital and hospital providers of pediatric emergency care within the study area;
2. Develop and implement a continuing education program, which will use mock scenarios to test skill acquisition or deterioration, for prehospital- and hospital-based providers;
3. Develop prehospital and hospital equipment and supply standards and a tool for measuring equipment and supply use; and
4. Implement the pilot EMSC program statewide (a long-term objective that extends beyond the project period).

METHODOLOGY: The four objectives will be carried out as follows:

Objective 1: A committee will be formed of representatives of the project investigators, MDPH/Division of EMS, and prehospital and hospital providers from the study area. This committee will develop guidelines and standards for the delivery of optimal emergency care for pediatric patients within the various components of the existing EMS system. Methods for each component of the EMS system are as follows:

Prehospital. Pediatric triage protocols will be developed. Pediatric patient care protocols will be implemented. Standards for pediatric equipment and supplies will be developed and implemented.

Rural hospital. Standards will be developed for the categorization of Michigan rural hospital emergency departments approved for pediatrics (MiREDAP), including staffing, staff education, equipment, and supplies.

Interhospital transfers. Hospitals throughout the State of Michigan will be accessed and classified as to their ability to care for critically ill and injured children in order to match patient needs to hospital resources and, in addition, limit transfer distances if possible. Transfer agreements will be obtained between transferring and receiving hospitals following the recommendations of the grant committee.

Objective 2: An educational program will integrate existing courses and curriculums for EMSC with a continuing education and assessment component including mock codes to address some problematic issues in current pediatric EMS training. An objective structured clinical examination (OSCE) format will be used to evaluate the proposed educational program.

Objective 3: An equipment and supply standard will be developed. This standard will be adapted from existing lists from past EMSC studies to address the needs of Michigan's rural pediatric emergencies in both the prehospital and the emergency department settings (with emphasis on trauma, respiratory distress, and seizures). Existing prehospital equipment will be updated to meet this standard. Hospitals participating as MiREDAP facilities will be required to update to this standard or to develop a plan and timeframe for meeting this standard.

Objective 4: Concurrent with the development of the pilot EMSC program, the committee will begin discussing mechanisms for implementing the program on a statewide basis.

EVALUATION: Evaluation will occur as follows:

Objective 1: Prehospital. Pediatric triage and patient care protocols will be evaluated by the MCA, using the existing quality assurance (QA) process. The QA process will be reviewed on a periodic basis, and modifications will be made as needed. The equipment and supply standard will be evaluated by means of a use analysis and by the mock code/scenario special education program.

Rural hospital. Staff education and skill level will be evaluated by the mock code/scenario special education program. The equipment and supply standard will be evaluated by means of a use analysis and by the mock code/scenario special education program. Staffing will be monitored by hospital administration under the direction of MDPH/Division of EMS.

Interhospital transfers. To assess compliance with interhospital transfer policies and agreements, a QA process will be developed to review all pediatric patients transferred from rural hospitals in the study area to specialized pediatric care facilities. This includes transfers from the inpatient units as well as directly from the emergency department. A panel with expertise in pediatric emergency medicine will be formed to evaluate the medical records for all transferred patients. This panel will be composed of emergency physicians, nurses, and prehospital providers. Panel members will review and score the records independently and will be blinded to date, county, and patient outcome.

Objective 2: For each scenario, critical interventions will be developed. In addition, participants will need to demonstrate the availability of equipment and its proper use during each scenario. The first OSCE will be conducted prior to any educational intervention and this will be a baseline skill measurement. Following the baseline measurement, the pediatric prehospital course and pediatric advanced life support (PALS) course will be given. Each course will be modified by the addition of material tested in the OSCE. Following this baseline educational program, the OSCE will be conducted at varying time intervals for each MCA. Improvements and degradation in performance will be measured.

Objective 3: Compliance with the equipment and supplies standard will be monitored on a regular basis. A monitoring tool will be developed in conjunction with the mock code/scenario special educational program. During the mock codes, providers will have to demonstrate the availability of equipment as well as proper use. A use analysis will be performed on the equipment and supply standard in both the prehospital and the emergency department settings. Prehospital data will be collected on equipment and supplies used during all transports of infants, children, and adolescents.

Objective 4: For the statewide program, the evaluation processes developed for the pilot program (objective 1) will be implemented within each MCA. The MCA, MDPH/Division of EMS, and the EMSC Committee will coordinate this effort.

Southwestern Illinois–St. Louis Bistate Regional EMSC (SISL) Project
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EMSC
MCH-294003
10/01/94–09/30/96
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PROBLEM: The Mississippi River defines the State boundaries between Missouri and Illinois and clearly divides the St. Louis bistate metropolitan region with both a geophysical and a psychological barrier. These barriers become problematic for the 140,000 children of southwestern Illinois who rely on the two pediatric hospitals in adjacent St. Louis, MO, for their tertiary trauma and medical care. Because of the State boundary, many of the Missouri activities and system changes connected with emergency medical services for children (EMSC) have not been implemented in adjacent southwestern Illinois.

GOALS AND OBJECTIVES: The Southwestern Illinois-St. Louis Bistate Regional EMSC (SISL) Project is a collaborative project with health care providers in southwestern Illinois and St. Louis, MO. The goals are to:

1. Enhance the ability of the existing emergency medical services (EMS) and health care system in southwestern Illinois to respond to ill and injured children with rapid, integrated, and skillful care at all EMS system levels and to facilitate the entry of these children into a bistate regional EMSC system;
2. Address, and suggest solutions to, challenges and problems specific to developing and administering a bistate regional EMSC system; and
3. Provide a coalition prototype applicable for use in other multistate EMSC regional systems.

METHODOLOGY: The Southwestern Illinois EMSC Coalition Subproject will develop: (1) Broad, community-based support for coalition activities; (2) an organizational structure for a regional EMSC coalition to plan and oversee the SISL subprojects and to provide a mechanism within the coalition to address EMSC local, bistate-regional, and statewide issues; and (3) a methodology to use existing and new data sources to describe and evaluate outcome, thus facilitating tracking of SISL project goals and objectives.

The primary care physician (PCP) outreach subproject will: (1) Develop and implement a survey and assessment tool to establish a data base of existing primary care resources and to evaluate primary care physicians' current capabilities and needs with regard to EMSC issues; (2) develop outreach and education mechanisms customized to primary care and pediatric emergency medicine issues; (3) develop a mechanism to clarify the role of southwestern Illinois general hospitals and emergency departments in pediatric care along with guidelines to improve access and appropriate referrals to these facilities; (4) develop guidelines to improve access and appropriate referrals to the specialized tertiary care pediatric resources in St. Louis; and (5) link PCPs with the Southwestern Illinois EMSC Coalition.

The emergency nursing education outreach subproject will: (1) Provide outreach and education through enhanced access to existing specialized training programs available through the Emergency Nurses Association (ENA); (2) develop a mechanism for these health care providers to assume leadership roles in developing health care policies that will lead to expanded pediatric capacity at all levels of the EMSC system; and (3) link the emergency nurses with the Southwestern Illinois EMSC Coalition.

The pediatric advanced life support (PALS) education outreach will: (1) Provide a core of PALS instructors from southwestern Illinois consisting of physicians, nurses, and/or paramedics who will be trained as PALS providers, then as PALS instructors; (2) provide onsite PALS courses in southwestern Illinois; (3) provide access to these PALS courses through scholarships; (4) develop a mechanism whereby these health care providers can subsequently assume leadership roles in developing health care policies; and (5) link emergency medical technicians-paramedics and emergency department physicians and nurses with the Southwestern Illinois EMSC Coalition.

EVALUATION: Lay and health care professionals' quarterly participation in EMSC coalition activities will be tracked and reviewed. A survey tool will track, on an annual basis, the impact on regional and statewide EMSC issues among coalition participants and lay community health care professionals. Descriptive statistics will evaluate data from the primary care physician survey and the assessment tool. The pretest and posttest format will measure changes in outreach programs. Descriptive statistics will be used to describe the nurse population in each ENA course, and a gross-measure-of-comfort pretest and posttest course will be developed and measured. This information will serve as pilot data in a larger population sample to clarify questions necessary for further analysis of similarities, differences, and outcome benefits for these two courses. Pretest and posttest knowledge and level of comfort will be evaluated for participants in PALS courses. Pretest and posttest case scenario management will be evaluated at PALS course time and repeated 1 and 2 years after PALS training to examine "extinction of skills" parameters.

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10/01/94–09/30/96
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Contact Person:
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PROBLEM: An effective system for collecting, processing, and analyzing data is an essential feature of quality emergency medical services for children (EMSC). Indeed, the recent Institute of Medicine (IOM) report on EMSC emphasized the importance of system surveillance and information management. To be most useful, information management systems should address collection and linkage of data at all points along the EMSC continuum of care. According to the IOM report, these data should also include all elements of a uniform national data set.

The major goal of the surveillance component of the current Nevada EMSC implementation project (1991–94) has been to establish an electronic linkage between two components of EMSC data—prehospital "run" reports and corresponding hospital discharge records—stored in separate data bases. Despite the achievement of this goal, several deficiencies and problems remain in the area of EMSC information management.

1. The common prehospital data set (i.e., EMSC Research Dataset) selected in 1991 and used thus far to abstract prehospital data for linkage with hospital discharge records has minimal prehospital clinical content and limited national recognition.
2. The State's hospital discharge data set (i.e., the Health Care Financing Administration's UB–92) is financially oriented and limited in its clinical usefulness for tracking patient outcomes.
3. The only other automated emergency medical services (EMS) data base, the State trauma registry, does not include data on critical illness or minor trauma cases.
4. Currently no uniform automated emergency department data base that would allow aggregation of EMSC data on emergency department services is used by hospitals in Nevada.
5. A uniform interstate data set that would allow data base linkages across State lines to track Nevada's interstate EMSC activities does not exist.
6. Other than the State trauma registry, Nevada has no EMS information system that records data on ethnic origin or prior health status; consequently, EMSC among ethnic minority groups and children with special health needs (CSHN) is particularly difficult to evaluate and plan.

These problems retard the process of quality management, system planning, resource allocation, research, and development of strategies for pediatric injury and illness prevention.

GOALS AND OBJECTIVES: This project takes the next steps toward establishment of a comprehensive, clinically relevant information management system for Nevada EMSC.

The project will:

1. Implement an expanded, standardized EMSC prehospital data set, based on the National Highway Traffic Safety Administration (NHTSA) Uniform Prehospital Dataset (UPD), in Nevada's two major population centers;
2. Maintain the current statewide linkage between the EMSC prehospital data base and the hospital discharge data base;
3. Develop and generate clinically relevant reports for EMS providers and agencies based on data contained in the linked EMSC records;

4. Develop recommendations for State health planners through the CPDR for augmentation of the hospital discharge data set to include additional outcome data for pediatric patients; and
5. Develop recommendations for State health planners on the implementation of a statewide system for collecting, storing, and processing information on emergency department services provided to children (i.e., a pediatric emergency department data base).

METHODOLOGY: The University of Nevada School of Medicine (Reno) will serve as lead agency for the Emergency Medical Services for Children (EMSC) System Enhancement Project. This project will be undertaken in consultation with Nevada's State and urban county EMS offices.

EMSC staff will modify the current EMSC prehospital data set used for linkage with the hospital discharge data base in three collaborating prehospital agencies representing 85 percent of the State's pediatric ambulance runs. The new EMSC prehospital data set will coincide with the recently developed NHTSA Uniform Prehospital Dataset. CPDR will provide the technical expertise necessary to configure the new prehospital data set. Using the matching program developed previously, EMSC and CPDR staff will ensure the preservation of linkage between the new prehospital data set and the State's hospital discharge records maintained by the CPDR. At this point, the EMSC and CPDR staff will also ensure maintenance of the linkage with the State EMS office's prehospital records for the rural Nevada communities; this will be accomplished in consultation with the State EMS Office, which has already implemented an early version of the UPD for its prehospital data management system. CPDR and EMSC staff will configure at least six standard reports summarizing the prehospital and hospital discharge data based on input from prehospital providers.

EMSC staff will develop a work group on discharge data base modification. This work group will meet during the course of the project and develop recommendations for changing the hospital discharge data base to include additional, clinically relevant data on pediatric outcomes. These recommendations will be directed to the State Department of Human Resources for action through the CPDR.

EMSC staff will also organize a work group on emergency department data base development. Using examples obtained from project consultants and other EMSC projects, this work group will develop a plan for a pediatric-oriented emergency department data base and its implementation statewide. These recommendations will be directed to the State Department of Human Resources for action.

EVALUATION: EMSC staff and the PI team will monitor progress in consultation with the project's advisory committee. Satisfactory progress will be identified in the following ways:

1. Demonstration of the essential elements of the UPD on review of the prehospital data base records at the three pilot agencies.
2. The ability of CPDR to link prehospital and hospital discharge records accurately on at least 90 percent of pediatric prehospital runs resulting in hospital admissions statewide. EMSC staff will ensure accuracy of record matches and nonmatches by a random manual record review.
3. Generation of at least six standard reports by CPDR based on the combined data base records.
4. Delivery of the EMSC recommendations to the Department of Human Resources for action.

New Hampshire Emergency Medical Services for Children
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EMSC
MCH-334002
10/01/94–09/30/96
Project Director(s):
Janet Houston

PROBLEM: New Hampshire's emergency medical services (EMS) system reflects the State's predominantly rural character, population distribution, tradition of rugged individualism, and desire for limited governance. The EMS system is highly decentralized, relying on grassroots town support for its survival and growth. No statewide or regional quality improvement occurs because no statewide data collection system is functioning. Hospital categorization and specialty trauma center designation are fragmented, and no integrated statewide trauma system exists. New Hampshire's emergency medical personnel have not had any training on the health care requirements for chronically ill children and children with special health needs (CSHN) living in their response areas. Neither have any linkages been forged between emergency medical services for children (EMSC) and the health care services for chronically ill children, based either at home or in the community. School nurses are inadequately prepared for pediatric emergencies, and neither school nurses nor coaches of children up to ninth grade have received any organized emergency education. Public access to EMS is primarily by unique ambulance telephone numbers; only 21 of New Hampshire's towns currently have 911. Information regarding injury prevention programs and supporting resources is not readily available to local EMS squads.

GOALS AND OBJECTIVES: Project goals are to:

1. Improve the provision of EMS to children with special health needs;
2. Enhance the provision of EMS by standardizing treatment and triage protocols and integrating these standards into the existing EMS system;
3. Link EMS and the public school health care system; and
4. Promote children's public information and education programs.

METHODOLOGY: The New Hampshire EMSC will organize a statewide committee. A CSHN emergency response program and a CSHN educational program for prehospital care providers will be developed and distributed.

We will gain pediatric representation on the EMS Medical Advisory Committee. Pediatric treatment standards and triage guidelines will be adopted and introduced into the existing educational system.

Elementary schools will be surveyed to determine the number of personnel trained to respond to pediatric emergencies, the availability and contents of first-aid kits, and the existence of protocols for response to emergencies. A pediatric emergency care training course will be developed for school personnel and EMS providers will be trained to teach courses in local schools.

An EMS access program for children will be developed and EMS providers will be trained to use the program and associated materials in their local communities. A public information and education resource guide for New Hampshire EMS providers, identifying educational programs and resource organizations and materials for injury prevention, will be published.

EVALUATION: The CSHN program will be monitored through reports of data collection results; minutes from coordinating meetings; the number of promotional packets distributed; evaluation forms completed by the children's parents; review of pretests and posttests; and participant feedback from the educational program.

Improvements in the standardization of EMSC treatment and triage protocols and the integration of these standards into the EMS system will be tracked by the formal adoption of the protocols; the naming of a pediatrician to the EMS Medical Advisory Committee; the number of algorithm cards distributed; the administering of examinations before and after the instructor course; participant evaluation questionnaires; the number of course directors contacted after the educational program; and a survey of providers' familiarity with and awareness of the protocols.

Improvement of the linkages between EMS and the public school system will be evaluated through the report and response rate of the survey; the number of participants in the educational program; and the pretests and posttests of the participants in the educational program and the course evaluations.

The public information and education programs for children will be evaluated by the number of participants reached, participant evaluations, and the number of resource guides distributed.

Enhancing Oklahoma's Emergency Medical System to Care for Pediatric Patients
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EMSC
MCH-404002
10/01/94–09/30/96
Project Director(s):
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Contact Person:
Ken Cadaret, C.N.S.

PROBLEM: The Oklahoma emergency medical services for children (EMSC) project was established by an MCH grant for EMSC program implementation in 1991. The Oklahoma EMSC project has accomplished the following: Upgraded the First Responder and Emergency Medical Technician (EMT) Basic curriculums to include information on pediatric emergency care; produced continuing education requirements for pediatric emergency care for EMTs; trained 230 EMT instructors in the new requirements; funded and developed a mandatory statewide prehospital report form; taught the Oklahoma Pediatric Emergency Course to 11 hospitals throughout the State; and produced and distributed a complete set of prehospital protocols designed for the first responder through the paramedic to all emergency medical services (EMS) providers. In addition, EMT intermediate and paramedic pediatric curriculums are being upgraded; State regulation now requires that ambulances be equipped with pediatric supplies and equipment; Emergency Department Approved for Pediatrics (EDAP) criteria are being incorporated into the development of a State trauma system; and 1,400 copies of an injury prevention videotape targeting the Native American population have been produced and distributed nationwide and in Canada.

The EMSC implementation grant was able to address many of the problems in the State. Now other problems need to be addressed to enhance the system. Oklahoma is largely a rural State with the majority of the EMS providers in nonmetropolitan areas. Institutions that provide training to prehospital providers and rural hospitals do not have the expertise or resources to teach pediatric material without assistance. The pediatric emergency training that is available to nurses and physicians is limited and costly and requires significant course and travel time for the rural provider. No training course for pediatric EMS medical directors is available in the State. The State support system for critical incident stress management (CISM) for EMS providers is not adequate. Organizations and State agencies that are charged with issues related to children do not have a resource to help them with their activities. Rural fatality and injury rates are significantly greater than in metropolitan areas. Child death rates are greatest for drownings, falls, burns, and vehicular crashes. EMT training requirements are not driven by State data. EMSC activities need to be institutionalized within the Oklahoma EMS system.

GOALS AND OBJECTIVES: The goals and objectives of the project are to:

1. Create the Oklahoma EMSC Resource Center, which will provide statewide technical support and assistance to EMS providers and child advocates.

   Objectives:

   a. Provide training resource services to 20 EMS educational instructors and 30 in-house instructors yearly;
   b. Provide training resource services to 30 hospitals yearly;
   c. Establish a loan library for audiovisual and teaching equipment;
   d. Obtain training and provide CISM services involving pediatric patients as needed;
   e. Provide pediatric medical director courses by September 1995 and yearly thereafter; and
   f. Provide ongoing assistance to child advocacy organizations and State agencies about to pediatric safety and emergency care issues.

2. Develop and initiate a Bystander Care program targeting the rural Native American population.

   Objectives:

   a. Establish a Native American Bystander Care task force by January 1995;

   b. Identify materials and the process for implementation by September 1995; and

   c. Provide 10 "train-the-trainer" courses by June 1996.

3. Establish a method for ongoing evaluation of pediatric prehospital run data to identify EMT training needs.

   Objectives:

   a. Establish the data set needed for evaluation of training needs by June 1995; and

   b. Make quarterly recommendations on EMT training needs to the Oklahoma State Department of Health, EMS Division, and the EMS Advisory Council.

4. Obtain ongoing State funding for EMSC activities.

   Objective: Introduce legislation in the Oklahoma 1995 legislative session to establish the Oklahoma EMSC Resource Center with appropriation support.

METHODOLOGY: The Oklahoma EMSC project is part of the Section of General Pediatrics, Department of Pediatrics, University of Oklahoma College of Medicine. Project offices are located at Children's Hospital of Oklahoma, which is part of the Oklahoma Health Sciences Center.

The Oklahoma EMSC Resource Center will be created to provide statewide technical support and assistance to EMS providers and child advocates. A system of support for the prehospital and hospital provider will be developed from our experience in initiating training for these groups in the past. Instead of doing all the training, we will support training organized by others. Instructors, audiovisual supplies, and teaching equipment will be provided by the resource center to support training. Advice on child safety and emergency care will be provided through participation in task forces and regular meetings of interested groups. The pediatric medical director course will be accomplished in conjunction with the State's trauma system development project.

A Bystander Care program targeting the rural Native American population will be developed and initiated. Native American, tribal, and Indian Health Service participation will be key to program development and implementation. This project will coordinate and assist these efforts and facilitate training activities.

A method for ongoing evaluation of pediatric prehospital run data to identify the EMT training needs will be established. The Oklahoma EMSC Prehospital Care Task Force, in existence for 2 years, will be used to identify and evaluate data sets to direct pediatric EMT education. The data sets and data will be taken from the Oklahoma mandatory prehospital run report form.

Ongoing State funding for EMSC activities will be obtained. Established advisory and consortium members will create a plan to obtain ongoing State funding and legislation. The perceived value of EMSC will be enhanced when it is seen as a resource center that provides support services to a variety of individuals and groups statewide.

EVALUATION: Evaluation will be based on the numbers served per objective. Complete records of request and services provided will be kept. Completion dates of activities, group minutes, and notes will be kept as appropriate for the objective.

Texas EMS for Children Enhancement Project
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EMSC
MCH-484002
10/01/94–09/30/96
Project Director(s):
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PROBLEM: Since the first emergency medical services for children (EMSC) grant was received in 1991, great strides have been achieved in the development of a cohesive emergency care system for pediatric patients. However, emergency health care workers have limited experience in treating children with special health needs (CSHN) and in knowing how to refer children to available resources.

In Texas in 1992, more than 1,700 children died as a result of intentional and unintentional incidents, resulting in the loss of more than 88,000 years of potential life. Most traumatic incidents are considered preventable; strategies for alternative approaches need to be defined and implemented on the basis of identified local and/or cultural differences in injury patterns.

Specific research projects are needed to obtain information and analyze the effectiveness of prehospital treatment as well as to identify commonalities and differences in rural and urban violence patterns, but little work has been accomplished in this area, particularly in relation to morbidity. Linkage of data records from various sources continues to be limited.

Specialized air transport/transfer services for neonatal and pediatric patients are needed in Texas because of its size. These services lack minimum staffing and equipment standards unless they are specifically licensed as EMS providers.

GOALS AND OBJECTIVES: Goals and objectives of the project are as follows:

1. Ensure effective triage of children with special health needs.

   Objectives:

   a. Develop/adapt/provide training in the recognition of emergent conditions in CSHN; and
   b. Develop and distribute a resource identification template for health care providers.

2. Decrease the incidence of children with intentional and unintentional injuries.

   Objectives:

   a. Evaluate commonalities and differences in urban and rural injuries and deaths related to violence; and
   b. Develop local injury prevention programs to address specific local and cultural phenomena.

3. Improve data collection, linkage, and dissemination of discovered information.

   Objectives:

   a. Establish linkages and cooperation among local, regional, and State agencies in the areas of data collection, injury control, and other safety promotion activities; and
   b. Evaluate the effectiveness and use of pediatric prehospital treatment modalities.

4. Establish rules requiring standards for neonatal and pediatric air and ground transport services.

   Objective: Develop standards for specialized transport service.

METHODOLOGY: The State of Texas has legislatively mandated that the EMSC program within the Bureau of Emergency Management, Texas Department of Health, integrate the needs of pediatric patients into the existing emergency medical services (EMS) system. This project will be coordinated by the EMSC program administrator with support from the following: (1) Bureau of Emergency Management staff; (2) task groups that will be assembled to complete specific objectives of this project, such as evaluating materials obtained from States with EMSC projects and from nursing and allied health training programs, adapting and developing training programs, and assisting in the development of draft regulations for specialized transport vehicles; and (3) organizations or individuals contracted to develop local pediatric injury prevention initiatives, develop or adapt training materials (including interactive software), and assist with the collection of data. Data collection and research activities will be conducted in conjunction with activities of local, regional, and State programs. Training will be provided for each of the identified problem areas.

EVALUATION: Process and outcome measures will be used to track project activities. Measures to be used will include the number and types of training materials developed; the number of individuals participating in and successfully completing training programs; the number of new local injury prevention activities initiated, such as the formation of local SAFE KIDS chapters; the number of articles and reports developed as a result of the data linkage and research objectives; and the level of decrease in preventable pediatric injuries and deaths to conform with the *Healthy Texans Year 2000* objectives.

RESOURCE CENTERS

National EMSC Resource Alliance
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(310) 222-3504 or 328-0720
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EMSC
MCU-064003
10/01/91-09/30/96
Project Director(s):
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Deborah Henderson, R.N., M.A.

PROBLEM: Since the establishment of the National EMSC Resource Alliance (NERA) as a resource center for emergency medical services for children (EMSC), there has been a continuing increase in requests for information about programs and products designed to improve the care of critically ill and injured pediatric patients. In the past 3 years, NERA has provided materials and consultation on various aspects of pediatric emergency care to professionals, agencies, organizations, and individuals interested in improving pediatric emergency care and integrating EMSC into emergency medical services (EMS) systems. This service has been provided to all States and territories and to many foreign countries. NERA is an accessible, convenient, and reliable resource for obtaining materials developed by EMSC grants and EMSC consultation. As more States become interested in developing EMSC within their EMS systems, the need for this resource center will continue to increase. In addition, States that have completed EMSC projects are returning for additional consultation in developing specific areas of EMSC.

GOALS AND OBJECTIVES: NERA is a collaborative effort of organizations, institutions, and individuals dedicated to improving the health care of infants, children, and young adults. NERA's overall goal is to serve as a resource for States and localities wanting to improve EMSC capacity within EMS systems.

The objectives are to:

1. Provide technical assistance to EMS and MCH agencies in developing manageable approaches to EMSC implementation;
2. Provide technical assistance to funded grantees in all aspects of project development;
3. Conduct outreach and provide intensive technical assistance to unfunded and previously funded States;
4. Analyze special issues and develop programmatic approaches to address EMSC needs;
5. Disseminate information on EMSC in ways identified jointly with the project officer at the Maternal and Child Health Bureau (MCHB);
6. Organize the annual EMSC Project Meeting;
7. Publish *EMSC News* and *EMSC Abstracts;*
8. Maintain the EMSC Computer Bulletin Board;
9. Conduct clearinghouse activities;
10. Maintain liaison with the National Resource Center (NRC) in Washington, DC, and with MCHB; and
11. Promote EMSC regionally and nationally.

METHODOLOGY: To complete these objectives, NERA will be working with key individuals from MCHB, the National Highway Traffic Safety Administration (NHTSA), NRC, and EMSC grant projects, and with representatives from many other organizations. Five subcontractors will work with NERA to provide these services: (1) The American Academy of Pediatrics assists with the Technical Advisory Board and in disseminating EMSC information through national meetings and committees. (2) The Los Angeles Pediatric Society coordinates activities targeting primary care providers. (3) The National Center for Education in Maternal and Child Health develops and prints the EMSC abstracts. (4) Circle Solutions distributes the abstracts and provides mailing labels for *EMSC News.* (5) Symposia Medicus will coordinate two conferences—the EMSC Project Meeting and the Leadership Conference.

NERA activities are coordinated with other State and local agencies, including the California Department of Health Services (DHS), EMS Authority, and the Los Angeles County DHS, EMS Division. In FY 1995 we will work more closely with the NRC in Washington, DC, in providing joint consultation in specific areas of expertise. To keep others abreast of NERA activities, *EMSC News* and other EMSC outreach products are sent on a quarterly basis to State and regional MCH directors and the California EMS Authority. NERA also coordinates and monitors a computerized bulletin board service on MCH-Net for communication with grantees and other interested parties.

EVALUATION: NERA evaluates all grant activities on an ongoing basis. Descriptive data are collected on time spent on NERA activities, on requests, and on resources provided. This information is used to ensure effective networking and outreach to all areas. EMSC grant products are evaluated and described in the catalog data base. Regional conferences and the EMSC National Conference are evaluated by attendees via surveys and questionnaires. All evaluative information is used to improve services continuously.

EXPERIENCE TO DATE: NERA has experienced a steady increase in requests for EMSC products and services over the past 3 years. These requests are becoming increasingly complex, requiring additional staffing and equipment and greater expertise in responding to them. The interest in and use of advanced technology for information transfer and education are also growing and will be a focus for NERA in the coming year.

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EMSC
MCU-114002
10/01/91–09/30/96
Project Director(s):
Jane Ball, R.N., Dr.P.H.

PROBLEM: Since 1985, 35 States have received State and/or targeted issues grants for emergency medical services for children (EMSC). These grants address specific needs and deficiencies in the areas of injury prevention, data collection and research, public and professional education, development of pediatric care standards, designation of pediatric referral centers, and issues related to long-term disability and impact after a disability. Unfortunately, most EMSC grantees have not achieved success in sustaining a coordinated program effort after the Federal funding has ended. Planning for long-term survival of the program within States is essential to maintain the advances in pediatric emergency care systems. New EMSC grantees need technical assistance in coalition building and public policy to mobilize community and financial support for long-term survival of the EMSC program. Most individuals and organizations at local, State, and national levels are not aware of the pediatric emergency care deficiencies and needs.

GOALS AND OBJECTIVES: Goals and objectives of the National Resource Center (NRC) are to:

1. Provide technical assistance to States in developing a manageable approach to ESMC implementation.

   Objectives:

   a. Assist emergency medical services (EMS) and maternal and child health (MCH) agencies in identifying and establishing linkages with other agencies at the State, regional, and Federal levels interested in EMSC-related issues;

   b. Assist EMSC projects in establishing at least one local or State coalition;

   c. Provide technical assistance in program development to EMSC projects with grants in the areas of planning, State systems, and State systems enhancement;

   d. Increase the number of public policy advocates for EMSC at the State and national levels during years 1 and 2;

   e. Regularly disseminate information about and foster involvement in public policy activities among EMSC projects; and

   f. Assist EMSC State grantees (implementation, enhancement, and targeted issues) to develop plans for continued activities after Federal funding ends.

2. Provide technical assistance to EMSC grantees in specific areas along the EMSC continuum of care.

   Objectives:

   a. By the end of year 1; provide technical assistance to EMSC grantees—particularly those in their first and second year of funding—regarding program planning, implementation, and evaluation in the area of injury prevention; and

   b. By the end of year 2, assist each EMSC grantee in identifying and implementing components and strategies related to rehabilitation of children with special health needs (CSHN).

3. Disseminate information on EMSC issues and needs to the public, professional organizations, and lay organizations.

   Objective: Develop a public education and information campaign about EMSC by the end of year 2.

METHODOLOGY: Project activities include: (1) Establishing contacts with representatives of key agencies and organizations; (2) providing States with technical assistance in areas of policy, funding, coalition building, CSHN, and injury prevention; (3) collaborating with NERA on technical assistance to EMSC projects; (4) managing a computerized data base; (5) monitoring EMSC legislation and disseminating *ON CALL*; (6) developing the EMSC public information and education campaign; (7) disseminating grants alerts; and (8) establishing an advisory board on issues related to CSHN.

At the NRC, efforts will be made to facilitate coordination among EMS, MCH, and other appropriate agencies at the Federal, State, and local levels. In addition, contacts with members of voluntary and professional organizations will be coordinated. At the national level, the NRC will strive to improve public awareness and increase visibility for EMSC within national organizations and agencies. The NRC will also coordinate efforts with NERA to achieve a unified approach to assisting EMSC projects and to increasing the visibility of EMSC.

EVALUATION: Evaluation will reflect the number of consultations provided in the areas of coalition building, project startup, public policy, funding, injury prevention, and rehabilitation. Process evaluation will also reflect the developmental stages of EMSC State and/or local coalitions and the number of national organizations that become involved with EMSC.

EXPERIENCE TO DATE: The NRC has provided technical assistance to years 1, 2, and 3 EMSC projects in the areas of coalition building, public policy, funding, and injury prevention for 3 years. Staff at the NRC conducted workshops on these topics at State, regional, and national meetings. Relationships are now established with approximately 43 national organizations and Federal agencies. Through this project, *EMSC—Rx for a Community Approach* was developed and disseminated to all EMSC projects. The NRC also disseminated a public policy newsletter, grants alerts, and information regarding organizations interested in EMSC-related issues.

TARGETED ISSUES GRANTS

Outcome Evaluation of Emergency Medical Services for Children
University of Arkansas for Medical Sciences
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EMSC
MCH-054002
10/01/93–09/30/95
Project Director(s):
Debra H. Fiser, M.D.
Nick Long, Ph.D.

PROBLEM: The mission of the Outcome Evaluation in Emergency Medical Services for Children (EMSC) project is to promulgate comprehensive systems of care that reduce the morbidity and mortality of child emergencies. Evaluation of the effectiveness of new programs, however, is hampered by several problems. First, death is a relatively low frequency event occurring in only 5–10 percent of the group at highest risk (pediatric intensive care unit admissions). As a result, a very large number of cases is needed in order to demonstrate a reduction in mortality related to system change. Second, morbidity is also an important outcome. Unfortunately, no suitable instrument is presently available for measuring morbidity in this setting.

An additional problem is that, despite an EMSC programmatic priority to evaluate "strategies to reduce the emotional toll of pediatric emergencies," the frequency, nature, or severity of the emotional toll and the subgroups that may be at risk for these problems have not been well established.

GOALS AND OBJECTIVES: The project has identified the following goals and related objectives to be completed during the 2-year project period.

Goal 1: The primary goal of our project is the validation of scales to measure cognitive and physical morbidity.

Objectives:

a. Our primary objective will be to determine whether the Pediatric Overall Performance Category (POPC) and Pediatric Cerebral Performance Category (PCPC) scales differentiate between children of varying cognitive and general adaptive functional abilities. To do so, we will test four hypotheses to determine the relationship between POPC and PCPC scores and other standardized instruments that measure the same constructs.

b. Secondarily, we will evaluate a number of additional measures of cognitive and general adaptive function for children in each POPC and PCPC outcome category.

c. We will evaluate the agreement between clinician and maternal ratings of PCPC and POPC.

d. We will assess the longitudinal stability over 6 months of POPC and PCPC ratings and other measures of physical/adaptive function and psychosocial adjustment.

Goal 2: A secondary goal is to investigate the nature, severity, and predictors of poor psychosocial adjustment following child emergencies.

Objectives:

a. We will assess child emergency outcomes in the following additional domains: Child behavior/adjustment, maternal psychosocial adjustment, child behavior, and family stress.

b. We will perform exploratory analyses to identify predictors of poor psychosocial adjustment.

METHODOLOGY: Investigators in the Pediatrics Department of the University of Arkansas for Medical Sciences plan an observational study including both cross-sectional analysis and prospective followup of a cohort of 200 patients discharged from the pediatric intensive care unit. The cohort will be accumulated consecutively over a 12-month enrollment period to a maximum of 25 patients in each of the 8 cells of the study. These eight cells are defined by the patient's age (under 42 months, or 42 months to 21 years) and hospital discharge PCPC score (1, 2, 3, or 4). Multiple measures of cognitive and physical function and psychosocial adjustment will be assessed at the time of hospital discharge, and again at 1 month and 6 months following discharge. Data will be summarized descriptively, then statistical procedures will be employed for hypothesis testing. Finally, exploratory analyses will be performed to identify predictors of outcome in the psychosocial domains.

Because of the research nature of the project, there will be no direct impact on State agencies or service areas. However, the directors of the following State agencies will receive copies of our quarterly report in order to apprise them of our progress: State Office of Emergency Medical Services, State Department of Health, and State Highway and Transportation Department.

EVALUATION: All objectives for the study will be completed during the 2-year project period. Progress in accomplishing objectives will be monitored and reported against quarterly interim milestones for numbers of patients enrolled and evaluated.

A Prospective Randomized Study of the Effect of Prehospital Pediatric Intubation on Outcome

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EMSC
MCH-064004
10/01/93–09/30/95
Project Director(s):
Marianne Gausche, M.D.

PROBLEM: Management of the airway is a vital part of the prehospital care of the critically ill or injured pediatric patient. Pediatric intubation is rapidly becoming part of the scope of practice of paramedic providers across the country. This standard is developing without conclusive evidence that intubation is beneficial to patients in the prehospital setting. In fact, data suggest the complication rate is 9–40 percent, which may be too high to justify its prehospital use. Retrospective studies of prehospital pediatric intubation have failed to include important components of study design, such as the inclusion of a control group to compare with the intubation group, well-defined indications for intubation, well-defined patient outcomes, and adequate sample size.

GOALS AND OBJECTIVES: Investigators at Harbor-UCLA Research and Education Institute, located on the southern campus of the University of California at Los Angeles School of Medicine, in collaboration with the emergency medical services (EMS) agencies of Los Angeles (LA) and Orange Counties, are currently implementing a large, randomized study of the effect of prehospital pediatric airway management techniques on patient outcome. Major goals for this study are to:

1. Educate all paramedics in LA and Orange Counties in pediatric endotracheal intubation;
2. Upgrade previously attained pediatric airway management skills, including bag-valve-mask (BVM) ventilation, obstructed airway management, and trauma airway management;
3. Evaluate the success and complication rates of pediatric intubation by paramedics;
4. Evaluate the efficacy of BVM ventilation alone versus BVM ventilation followed by endotracheal intubation in the prehospital airway management of pediatric patients;
5. Determine how long paramedics retain an adequate skill level after being trained in BVM ventilation and intubation;
6. Estimate the system and provider agency cost of the additional training;
7. Estimate the cost per life saved by including pediatric intubation in the paramedic scope of practice; and
8. Establish a large, urban EMS research coalition.

METHODOLOGY: Two nurse educators have begun educating nearly 2,800 paramedics in LA and Orange Counties in advanced pediatric airway management. Educational objectives were identified, and a curriculum was developed, consisting of didactic, interactive, and mannequin training sessions for a total of 6 hours. A 24-minute video titled *Airway Management for the Pediatric Patient* was produced by the project. This video is used in the didactic portion of the training. A student manual authored by the project's Education Subcommittee is used by the paramedics as the airway management course text. An instructor's manual, which includes slide sets and information on how to conduct a prehospital pediatric airway management course, was also developed. More than 350 of the nearly 2,800 paramedics in both counties have been educated in pediatric airway management, and project investigators are evaluating the success rate, complication rate, and effect on outcome of prehospital pediatric intubation and BVM ventilation used by these trained paramedics in the field.

Indications for prehospital airway management for pediatric patients in this project include medical or traumatic cardiopulmonary arrest, late respiratory failure, respiratory arrest, and severe airway obstruction. BVM ventilation is the current standard of therapy in LA and Orange Counties for patients who need prehospital airway management and are younger than 12 years of age or weigh less than 40 kilograms.

Critically ill or injured pediatric patients as defined in this project receive BVM ventilation on odd calendar days and BVM ventilation followed by pediatric intubation (BVM/ET) on even days. Initial data on study patients and their prehospital management are obtained by the paramedics caring for the patient. Followup data on complications and outcome are obtained by project investigators. Retention of airway management skills will be evaluated by assessing the skill proficiency of a subset of paramedics every 6 months throughout the project. Cost analysis of education and skills maintenance will also be performed. The duration of this project will be 2 years once all the paramedics have been trained.

Project investigators have collaborated with existing EMS agencies in LA and Orange Counties to implement this project. Four major committees coordinate this project. The Steering Committee, with representatives including pediatric emergency medicine experts, local EMS agency personnel, and paramedic providers, oversees all aspects of the project from design through implementation. The Education Committee oversees the development and implementation of the paramedic educational curriculums. The Data Management Subcommittee supervises the data collection and analysis for the project. The Implementation Management Subcommittee is responsible for the dissemination of all information to EMS provider agencies, EMS providers, and other project committees and for preparing correspondence and reports related to the project.

EVALUATION: The Data Management Subcommittee reviews the accumulating data, analyzing them for evidence of effect of treatment group (BVM versus BVM/ET) on outcome and for evidence of an unacceptable complication rate. Descriptive analyses will be performed on demographic variables and on variables related to paramedic performance (success and complication rates of airway management), retention of skills, and cost of implementing the educational program. Logistic regression will be used to analyze the effect of management strategy on patient outcome, and adjustments will be made for the effects of other clinical variables that also affect outcome (e.g., age, cause of respiratory failure).

EXPERIENCE TO DATE: Project objectives are currently in various stages of completion. The educational curriculum is being implemented in both counties with great success. Paramedic response to the curriculum is overwhelmingly enthusiastic. The randomized study is underway, and nine patients have been enrolled in the study. Paramedics have followed study protocol and have been notifying investigators when patients meet entry criteria and are managed in the field with either BVM ventilation or intubation. Analysis of skills retention, estimation of training costs, and evaluation of continuing education methods will all begin during the final half of the first year and continue throughout the second year of the project. Problems in project implementation have been few despite the tremendous size of this project. The key to the success of this project has been collaboration and ongoing communication among investigators, EMS agencies, paramedic provider agencies, nurses, physicians, and paramedics from the initial planning phases through the implementation of the project.

Evaluation of California Emergency Medical Services for Children Model

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MCH-064005
10/01/93–09/30/95
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PROBLEM: The Federal Emergency Medical Services for Children (EMSC) program has brought powerful visibility to issues in pediatric emergency and critical care and has helped create numerous State and local programs aimed at the prevention and management of acute childhood illness and injury. In California, the work of the original EMSC Demonstration Project and of the 1991–93 Targeted Issues Grant has laid a broad and sturdy foundation for widespread integration within local emergency medical services (EMS) systems. The 1991–93 Targeted Issues Project established a comprehensive model for an integrated pediatric emergency and critical care continuum—from prevention through treatment, specialized care, and rehabilitation.

While the California EMSC model provides a clear set of guidelines for clinical and operational elements that are essential to implement emergency medical services for children, no objective evaluation component gauges the cost or effectiveness of these services. No EMSC project has yet provided such analysis. Key ingredients are missing in an evolving concept of EMSC at the local, State, and national levels. Therefore, pediatric emergency and critical care systems face a growing imperative to integrate objective system evaluation with system planning, implementation, and management in order to justify public expenditures and to validate EMSC guidelines.

GOALS AND OBJECTIVES: The first goal of this project is to monitor and evaluate the California EMSC model in two EMS systems (one urban, one rural) in order to analyze the administrative and program costs of implementing the model. We will provide funding from the Preventive Health and Health Services (PHHS) Block Grant to two local EMS agencies (California's equivalent of EMS regions). These agencies will implement pediatric subsystems based on the California EMSC model. During this implementation, we will analyze the administrative costs of implementing the model (including planning, implementation, and monitoring of the pediatric subsystem) and the program costs (including both one-time expenses and ongoing costs).

The second goal is to identify political, technological, legal, and financial barriers to implementation of the California EMSC model. We will accomplish this by monitoring and evaluating the implementation process and through interviews with system participants.

The third goal is to promote statewide acceptance of the California EMSC model. We will survey EMS system lead agencies regarding the current status of pediatric subsystem development. We will also conduct consultation visits to each of the 32 EMS system lead agencies to obtain feedback on the content of the California EMSC model and to determine the feasibility of its implementation. This will culminate with a training session for EMS system lead agency staff on implementing the California model.

The final goal is to revise the California EMSC model and distribute it nationally. We will base the revisions on the lessons learned from the two grantee agencies and from the survey and consultation visits. We will distribute the final products nationally and will present them to an appropriate national audience.

METHODOLOGY: Our major activity will be to provide grant funds to two local EMS agencies and to conduct a real-time evaluation of their implementation process. We will receive and analyze the data that the agencies have agreed to submit and will meet monthly with agency staff. Reports will be issued regarding costs and barriers to implementation.

In addition, we will use statewide survey and consultation visits to identify implementation barriers and to promote implementation of the model. We will conduct a training session in cooperation with the Emergency Medical Directors Association of California.

In each stage, we will use information from the National EMSC Innovation Bank and consult with the National EMSC Resource Alliance.

The California Emergency Medical Services Authority is the State lead agency for EMS. We will provide PHHS Block Grant funds to two local EMS agencies and will use the grant process to coordinate with them. We will have direct contact with each of the local EMS agencies in the State. Additional coordination will result from continued collaboration with the California Pediatric Emergency and Critical Care Coalition and Project Steering Committee, which were instrumental in the development of earlier EMSC products.

EVALUATION: Specific tracking techniques for each stage of the methodology include contracts between the California EMS Authority and the two grantee agencies; submission of required reports; completion of site visits, interviews, and the training session; and issuance of the final reports for each objective and of a revised California EMSC model.

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EMSC
MCH-094002
10/01/94–09/30/96
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PROBLEM: School nurses in many States have been underused by emergency medical services (EMS) systems as health professionals providing prehospital care to children and youth. School nurses recognize their need for a program that will prepare them to provide appropriate emergency care in schools or at school activities. The emergency care courses available to nurses are targeted to hospital settings or medical transport.

In 1985, the Department of Pediatrics, Health Center, University of Connecticut, in collaboration with the State Department of Education's School Health Services consultant and the State Office of Emergency Medical Services, developed an effective model for school nurses that combines EMS and nursing. This program has trained more than 900 nurses but needs updating and refining for national dissemination.

GOAL AND OBJECTIVES: The project goal is to reduce morbidity and mortality in children and youth who are injured or become ill at school through the development, implementation, and national dissemination of an effective training model—School Nurse Emergency Medical Services for Children (SNEMSC).

The objectives are that school nurses will:

1. Use prioritized assessment skills recognized by emergency medical services for children (EMSC) in identifying emergency situations and determining the seriousness of an illness or injury to a student;
2. Provide a level of prehospital care in schools that conforms with EMSC protocols and policies, the American Nurses Association's 1993 *National Standards of Clinical Nursing Practice,* and the National Association of School Nurses' 1993 *School Nursing Practice, Role and Standards;*
3. Collaborate with school administrators, school medical advisors, and public safety services in developing a comprehensive school emergency plan that establishes pediatric protocols for school health services and adequate communication between school and community services to provide access to emergency medical services for all injured or seriously ill students;
4. Develop intervention strategies for specific students in collaboration with primary care providers, parents (and students, when appropriate), school medical advisers, school staff, and local prehospital and EMS providers to ensure access to appropriate emergency services for students with special health needs; and
5. Collect and analyze data on school-related injuries or serious illness to reduce risk of injury and improve the health and emergency care of students.

METHODOLOGY: The project plan is to restructure the existing Emergency Care Training for School Nurses course with the collaboration of such organizations as the Association of Maternal and Child Health Programs, Emergency Nurses Association, National Association of School Nurses, and National Association of Pediatric Nurse Associates and Practitioners for national implementation and dissemination. The School Nurse Emergency Medical Services for Children program is designed with five distinct but interconnected phases.

Phase 1 is the initiation of the SNEMSC program. A SNEMSC office and staff will be established at the Department of Pediatrics; members will be selected for the steering committee and the national advisory committee; an agreement will be formalized with the Bureau of Educational Research for evaluation; and resources, programs, writers, and consultants will be identified.

Phase 2 is program development. The student and instructor manuals will be rewritten for multistate use. The initial drafts will be used in a pilot program in Connecticut. Content for each module will be assessed for validity and reliability, and modifications will be made as needed. Computer- or technology-assisted learning will be considered for delivery of the program. Criteria for instructors and out-of-State pilot sites will be established.

Phase 3 is implementation of the SNEMSC program. The project will conduct three pilot programs out of State to further test course content and effectiveness. Ten instructors will be selected from other States for a "training-of-trainers" workshop at the beginning of year 2.

Phase 4 is dissemination of the SNEMSC program. During this phase, the student and instructor manuals and instructional materials will be published, and each of the 10 instructors will replicate the program at least once. Project staff will observe the replication courses and provide technical assistance or problem resolution.

Phase 5 is SNEMSC program evaluation.

EVALUATION: Qualitative evaluation is a major component of the development of the curriculum and workshop instruction of the SNEMSC program. Included in the evaluation are: (1) Development of the initial measure—a knowledge and skill measure covering content across all instructional modules and aimed at reliability, content validity, and suitable item difficulty and discrimination; (2) emergency practice self-efficacy tools, one for each module, administered before and after the workshop and again 6 months after the workshop; (3) a self-report questionnaire on perceived change in emergency care delivery, administered 6 months after the workshop; and (4) a self-report questionnaire evaluating the workshop instruction quality and the instructional materials usefulness. Quantitative evaluation will show the number of school nurses participating during the pilot and dissemination phases, the number completing the prescribed program activities, and the compilation of injury survey data collected by school nurses participating in the pilot programs.

Effective Communication and Cultural Competence in Emergency Care of the Adolescent: A Curriculum for Emergency Medical Service Providers

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MCH-114003
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PROBLEM: The past three decades have been marked by a dramatic shift in patterns of adolescent morbidity and mortality. Organic etiologies of disease have declined dramatically, while psychosocial and behavioral problems and injuries related to high-risk activities figure prominently in why adolescents currently use emergency medical services (EMS). Lack of appropriate training, lack of communication skills, and lack of confidence are barriers that prevent many health care providers from delivering quality adolescent care. Several comprehensive efforts have been undertaken to address these deficiencies in primary care settings. However, little attention has been paid to the adolescent patient in emergency care settings. Misunderstanding of the adolescent patient is often complicated by sociocultural differences between patients and members of the health care delivery team.

GOALS AND OBJECTIVES: The project goal is to improve EMS provider capabilities in communicating with and understanding adolescents. The two primary objectives are to:

1. Develop an adolescent health curriculum for EMS providers, focusing on interpersonal skills and cultural competence, by year 1; and
2. Provide the adolescent emergency education program to at least 144 providers through six course offerings in year 2.

METHODOLOGY: The curriculum will be developed to reflect current knowledge in adolescent health and cultural competence. Several educational modalities, including lectures, case scenarios, role playing, self-assessment exercises, and small group discussion, will be used to present material in five main content areas:

1. Cognitive and maturational patterns of adolescent development;
2. Common behavioral and psychosocial emergencies of adolescence;
3. Legal issues pertinent to the care of adolescents in emergency settings;
4. Self-exploration of cross-cultural knowledge, beliefs, attitudes, and practices; and
5. Knowledge relevant to culturally competent care of specific cultural groups.

EVALUATION: Successful completion of a comprehensive program manual, accompanied by an instructors' guide and supporting educational tools (i.e., slides and instructional videotapes), will serve as evaluation criteria for objective 1. Assessment of the numbers of courses given, as well as the numbers of providers instructed, will serve as evaluation criteria for objective 2. To evaluate course content, pretesting and posttesting of specific knowledge points will be used as a short-term objective measure of the project's success at meeting the stated goal. A long-term assessment of changes in participant perceptions and behavior will be evaluated through the comparison of baseline information collected during the self-assessment exercises and a followup survey sent to program participants 2 months after course completion.

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MCH-174002
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PROBLEM: Injuries from gun assaults have dramatically increased in recent years. Homicide is the leading cause of death for black male youth. Eighty percent of these deaths involve firearms. Effective interventions for preventing violence are lacking.

GOALS AND OBJECTIVES: The goal of this project is to develop and evaluate effective intervention models that contribute to reducing both the incidence and the lethality of violence.

Development of a peer role model intervention will be the first component of the project.

In the second part of the project, emergency medical services for children (EMSC) personnel will be trained to be violence prevention educators.

METHODOLOGY: The Department of Preventive Medicine, Northwestern University Medical School, working closely with the Department of Pediatrics, Children's Memorial Hospital, is joining forces with a community-based organization, Cabrini Green Youth Program (CGYP), to develop a multifaceted approach to decrease violent injuries among urban youth. CGYP, a 10-year-old program, serves Cabrini Green, a nationally known pocket of inner-city poverty and violence. One of its 13 weekly activities involves adolescents teaching younger children about risky behaviors. Assessment of the efficacy of the CGYP peer modeling intervention requires a systematic approach. It will require establishing a data base, obtaining baseline data and serial measurements, developing and presenting the violence prevention curriculum, and evaluating the curriculum's effects. Twenty adolescents, with guidance, will develop 10 violence prevention activities per year to teach 60 children ages 6 through 12.

Producing violence prevention educators also requires a stepwise plan—developing a new EMSC product, providing EMSC training, and making public education presentations. The EMSC product will include a slide set and lecture materials that EMSC personnel will be able to use for future public speaking efforts. They will also attend a 2-day seminar on effective public speaking. Some veteran EMSC personnel will be enlisted to become EMSC trainers and will play a significant role in teaching the next group of EMSC personnel.

EVALUATION: Several outcome measures will be used to assess the effectiveness of the CGYP peer mentoring. The adolescents will take a self-image survey three times in the next 2 years to measure changes in their self-esteem. The CGYP 6- to 12-year-old children will be compared with a control group of Cabrini Green children who are not in CGYP. Three serial outcome measures will be used—a violence knowledge study, school behavior, and emergency department use.

To assess the effectiveness of EMSC training, EMSC personnel will keep track of how many lectures they give. A clipping service will be retained to assess media coverage.

Methodology for Evaluation and Reduction of Pain and Distress in Pediatric Emergencies

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MCH-294002
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PROBLEM: Medical emergencies are among the most distressing events in the lives of children and their families. Frightening and painful diagnostic and therapeutic procedures often occur; yet the pain, fear, and anxiety confronting children and parents are frequently unrecognized and poorly controlled in the emergency medical services (EMS) setting. Providers of emergency medical services for children (EMSC) must begin to employ techniques to minimize pain and reduce the emotional toll of the emergency on the child and family. A standardized, rigorous, and reliable technique is needed to evaluate the pain and anxiety experienced by those involved in pediatric emergencies. A strategy for evaluating and reducing the pain and distress of children and their parents during childhood emergencies is an important step toward improving the emotional and physical outcome for sick and injured children and their families.

GOALS AND OBJECTIVES: The goal of this project is to reduce the physical and emotional impact of emergencies on the child, the family, and the health environment. We have developed a methodology to assess interventions designed to reduce pain and distress during emergency procedures and thereby improve the emotional well-being of the child and parents. We are testing assessment tools in a prospective trial to validate the methodology. This methodology will form the basis for development of derivative and more portable instruments, which can be used to assess additional interventions and train other providers to recognize pediatric distress and will reduce the emotional toll of injury and illness in the EMSC setting.

METHODOLOGY: We are conducting a randomized clinical trial comparing two regimens—ketamine/midazolam and fentanyl/midazolam—to minimize pain and distress in a sample of children ages 5–15 with orthopedic injuries requiring emergency procedures. To assess the pain experience, we are using the Observation Scale of Behavioral Distress (OSBD) to score videotaped records of pain behaviors and the Faces visual interval pain scale to document the child's self-report. We are monitoring child-parent and child-provider interactions. Linear analog scales are used to evaluate anxiety in parents. To evaluate problems associated with our interventions we are documenting the physiologic complications and the adverse effects of the therapies employed. Physician satisfaction is assessed, as are long-term outcomes for the children and parents.

The Missouri Department of Health and other pediatric centers in Missouri support this project. These centers anticipate using the methodology or its derivatives to evaluate and reduce stress in pediatric emergencies.

EVALUATION: In the initial 3 months, we monitored installation of the equipment, training of staff in the study protocol, and pilot testing of the measurement tools to establish reliability. In the current 18-month period, we are monitoring data collection: Enrollment, randomization, administration of the pain and anxiety tests, and documentation of physiologic data and complications of therapy. Videotapes are reviewed for behavioral data coding. Collected data are managed with a computer-generated data base. The final 3 months will be devoted to data analysis and outcome reporting. Project activities are tracked through investigator conferences.

EXPERIENCE TO DATE: The system setup, including video recording and physiologic monitoring systems, has been completed. The training of emergency department providers in the study techniques and in equipment operation has been completed.

The pain and distress assessment techniques were pilot tested and adapted for the conscious sedation procedures in the emergency department. Blinded reviewers were trained to code the adapted Observation Scale of Behavioral Distress, and interrater reliability was confirmed.

Patient enrollment and data collection have begun. Coding of patient data is also in progress. Preliminary data were analyzed for presentation at the national EMSC conference in April 1994 and for presentation at the national meetings of the Ambulatory Pediatric Association and the Society for Academic Emergency Medicine in May 1994.

Psychological First Aid for Violent Injuries to Children

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MCH-294004
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PROBLEM: The incidence of the involvement of children in violent acts is exceedingly high in Kansas City, MO, as in other metropolitan areas. Studies have shown that children who witness violent acts may suffer from posttraumatic stress disorder, but that some short-term intervention—Critical Incidence Stress Management (CISM)—has proven effective in ameliorating this stress reaction in adolescents and adults.

GOALS AND OBJECTIVES: The Psychological First Aid (PFA) for Child Violence Witnesses Project focuses on the problem of the psychological and emotional impact that witnessing an act of violence (e.g., homicide) has on a child. The overall goal of this project is to enhance the community's ability to respond to the growing incidence of violence and its impact on the children who view the violence.

The objectives are to:

1. Establish a community referral network among organizations and systems that respond to and treat children affected by violence;
2. Train and implement multidisciplinary pediatric CISM teams who are sensitive to children of diverse cultures;
3. Identify and reduce the emotional toll on children ages 5–11 who witness violence in the target community of Kansas City;
4. Establish a baseline data set on the incidence of children under the age of 16 in Kansas City who witness homicides and firearms injuries to another child; and
5. Disseminate to a wide audience the findings on community response and childhood witness to violence and firearm injuries.

METHODOLOGY: A Psychological First Aid network will be established with representatives of organizations and systems—including police, MAST Emergency Services, Children's Mercy Hospital, YouthNet, schools, Ad Hoc Group Against Crime, Division of Family Services, and Family Court—that respond to and treat children who witness or are affected by violence. Referral of children and information for the data base will be provided by these organizations.

The CISM program will be adapted for a younger age group and a training manual will be produced. Multidisciplinary teams consisting of a social worker, a psychologist, an emergency medical services (EMS) worker, adolescents, and a community worker will be formed and trained in the adapted CISM program.

Within 72 hours of a referral from the PFA network, a team will visit with the child who witnessed the violence and with the child's family to conduct the CISM training. A second followup visit will include use of Garbarino's *Let's Talk About Living in a World With Violence.* Followup, when needed, will be through the Marillac Center (psychological therapies) or support groups.

A baseline data set on childhood witnesses to violence (homicides) and pediatric firearm injuries will be maintained. Prevalence of childhood witnessing of violence and posttraumatic stress disorder will be determined on the basis of surveys in three elementary schools and two junior high schools in the Kansas City, MO, School District.

Training in these techniques for EMS workers will be conducted first statewide and then regionally.

EVALUATION: Profiles of the children served and those referred to the PFA network will be developed and updated semiannually. Preintervention assessment will include drawings based on the Garbarino workbook, the Children's Behavior Checklist, and the Reaction Index. Postintervention assessment will occur at 1 month and 6 months. Two control groups of children, one living in high-crime ZIP Code areas and one living outside high-crime ZIP Code areas, will be used as comparisons with the children receiving the intervention.

EMS Personnel as Community Injury Prevention Advocates

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PROBLEM: New Mexico has the second highest injury fatality rate in the country. Several factors contribute to this high injury rate: A young population, a high proportion of ethnic and minority groups, and a high rate of poverty. Factors such as youth, minority status, and poverty are associated with higher rates of risk taking and injury. While these factors may seem overwhelming, our previous project in emergency medical services for children (EMSC) has made significant progress in increasing attention to and improving the health of children and families in New Mexico. The existing emergency medical services (EMS) system in New Mexico now has an enhanced capacity to care for the pediatric patient: (1) Improved ongoing statewide clinical training emphasizing pediatric patients for emergency medical technicians (EMTs), nurses, and physicians; (2) research illustrating risk factors for childhood injury; (3) community outreach and coalition participation by EMSC project staff; and (4) injury prevention demonstration projects. Injury prevention and community and coalition building were the cornerstones of our original EMSC project. In a rural State such as ours, EMS personnel are often the most medically sophisticated people in the community and are ideally suited to play an expanded role in injury prevention. To encourage EMTs to join our efforts, we incorporated injury prevention ideas in all pediatric curriculums revised by our EMSC project and developed *An EMT's Handbook for Injury Prevention and Community Action.* We will develop the prevention network and momentum begun on our original project among EMTs by defining their role in the prevention of both unintentional and intentional injuries. While the emphasis is on injury prevention, the project will allow us to institutionalize the role of EMS personnel as prevention advocates in New Mexico and lay the groundwork for the development of expanded EMS involvement in other areas of public health, such as immunizations and well-child checkups.

GOALS AND OBJECTIVES: The overall goal of this project is to reduce the morbidity and mortality associated with childhood injury in New Mexico by establishing and developing the State's capacity for coordinated planning, implementation, and evaluation of injury prevention projects by prehospital providers in both rural and urban areas of the State. We seek to link EMS personnel with existing community coalitions, primary care providers, law enforcement, and other available resources to enable EMTs to use their prevention training and skills successfully.

METHODOLOGY: The University of New Mexico (UNM) Department of Emergency Medicine (DEM) is the agency for this project. DEM has established a strong commitment to both the treatment and the prevention of injury and illness in children in collaboration with the Department of Pediatrics. DEM will ensure consistency and quality of the project by hiring one full-time person to offer technical assistance and monitor the program in coordination with an advisory committee and other project staff. Particular emphasis will be on training EMTs in the basics of injury prevention, coalition and community organizing, accessing available resources, and institutionalizing projects to continue when EMSC funding ends. We will use a decentralized approach that will allow both paid and volunteer EMTs to obtain technical assistance to identify local pediatric injury problems and resources, develop or join local coalitions, and implement and evaluate prevention programs. University technical support will be provided through telephone computer interfaces and onsite consultation. By

emphasizing a grassroots approach, we will ensure that the content of programs developed reflects the particular needs of the community as well as the special developmental needs of children. EMS sources that serve minority and rural populations will be specifically targeted for direct technical assistance. Existing prevention materials will be available at no cost, and competitive incentive project moneys will be available. Nonmedical continuing education units will be offered as further incentives for prevention projects that meet specific criteria.

EVALUATION: Methods to track and evaluate our progress will include the following:

1. An advisory committee, composed of key community leaders, that meets quarterly to advise on EMSC staff efforts and guide priorities;
2. A report on the number of EMTs recruited to coordinate and participate in community injury prevention projects;
3. A report on the frequency of use of national, State, and local resources;
4. The amount and type of technical assistance offered;
5. Reports of project type (intentional or unintentional) and the amount of money involved;
6. Development of monitoring and reporting of project-specific evaluations for incentive projects; and
7. The number of projects that continue when EMSC funding ends.

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MCJ-364004
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PROBLEM: The problems of training prehospital personnel to care for children have been outlined in the Institute of Medicine report. Many of these problems are addressed in the new Emergency Medical Technician Basic (EMT-B): National Standard Curriculum. However, the leaders in emergency medical services (EMS) education recognize that EMS instructors do not currently have the knowledge, clinical experience, or educational resources to adequately teach the entire new pediatric content.

GOALS AND OBJECTIVES: The goals and objectives are to:

1. Create an educational resource that will enable emergency medical technician (EMT) instructors to effectively teach the pediatric portions of the new EMT-B curriculum.

   Objectives:

   a. Define the scope of pediatric knowledge necessary for EMT instructors teaching the new EMT-B curriculum;

   b. Develop the Instructor Resource for Teaching Prehospital Pediatrics (IRTPP) based on the EMT-B curriculum; and

   c. Distribute the IRTPP.

2. Evaluate the effectiveness of IRTPP in enhancing the EMT instructors' ability to teach the new EMT-B curriculum.

   Objectives:

   a. Create an evaluation tool to measure the effectiveness of IRTPP; and

   b. Assess the impact of IRTPP use on EMT-B curriculum instructors and students.

METHODOLOGY: A review board consisting of experts in emergency medical services for children (EMSC), EMS education, pediatrics, emergency medicine, pediatric surgery, and emergency nursing will be established. An outline for pediatric content of the new EMT-B curriculum will be submitted to the review board; the final outline will be based on the experts' input.

On the basis of the content outline, medical, EMS, and educational experts will write a working draft of the IRTPP. One national workshop and three regional workshops will be presented to obtain input from EMT instructors who are the IRTPP target audience. The national workshop will be held in conjunction with the annual meeting of the National Association of EMS Physicians. The regional workshops will be held in New York City (urban center), Connecticut (suburban), and Puerto Rico (rural). Feedback from these workshops will be evaluated by the review board and incorporated into the final IRTPP draft.

Depending on the final document's length, between 5,000 and 10,000 copies will be distributed throughout the country via State EMS offices, professional organizations, the National Center for Education in Maternal and Child Health (NCEMCH), and the National EMSC Resource Alliance (NERA).

An evaluation instrument will be created to measure the IRTPP's effectiveness. This two-part process will consist of (1) a measure of change in student cognitive, psychomotor, attitudinal, and integrative performance; and (2) a measure of change in instructors' educational proficiency based on independent observation according to set criteria and student assessment of instructor performance.

The evaluation instruments will be used to measure the educational impact of the IRTPP. This will be accomplished using a prospective, equivalent comparison experimental study design. Two instructor groups will be followed. The difference in both instructor and student performance will be measured using the grant-created evaluation tools. The anticipated observations are that: (1) There will be no difference between the first classes taught by the experimental and control instructor groups (confirmation of randomization); (2) the difference from the first to the second class taught by the control instructor group will be due to instructor maturation alone (measurement of maturation); (3) the difference from the first to the second class taught by the experimental instructor group will be due to instructor maturation *and* the IRTPP; and (4) in the second classes, the only difference in instructor and student performance between classes taught by the experimental and control instructor groups will be the IRTPP. By comparing these observations, we will be able to measure change in instructor and student performance due to the IRTPP.

EVALUATION: Changes in instructor performance as well as prehospital provider knowledge, attitude, skill, and behavior will be measured. Grant-created assessment tools will be used. This evaluation will demonstrate the IRTPP's impact on EMT-B instructors and will assess improvements in EMT-B student performance. A positive evaluation will show that the IRTPP can have a significant impact on the delivery of pediatric prehospital care on a national level. Project activities will be tracked through regular meetings of project personnel to review the status of objectives and contributors' progress and to monitor related activities with respect to the targeted completion dates. Achievements will be measured by obtaining consensus by the investigators and the review board on the scope of knowledge as defined in the content outline; consensus by investigators and the review board on the final draft of the IRTPP; confirmation of IRTPP distribution via data provided by NCEMCH, NERA, and State EMS offices; consensus by educational consultants on the final version of the IRTPP evaluation instrument; and completion of the educational program, administration of evaluation instruments, and data analysis of the impact of the IRTPP.

EMSC Data Enhancement Project
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EMSC
MCH-424002
10/01/94–09/30/96
Project Director(s):
Harold B. Weiss, M.S., M.P.H.
Contact Person:
Michael M. Crouch

PROBLEM: The recent report of the Institute of Medicine (IOM) on emergency medical services for children (EMSC) says that understanding and overcoming the EMSC information gap requires compiling data on the particular role that individual system components play in emergency care. Only by understanding and enhancing individual components can we take full advantage of the power offered by future linkage and integration of separate data components. The lack of standardized and representative data on the Nation's pediatric emergency department visits is one such critical information gap. Emergency departments are a core component of the emergency medical services (EMS) system; millions of children are treated each year in U.S. emergency departments. Virtually every EMS run involves a delivery to a hospital emergency department. Despite the pivotal role emergency departments play in the EMS system, however, no nationally representative data on them have ever been available. However, the National Center for Health Statistics (NCHS) has just completed the first national survey of emergency department medical care. The first year of survey data from the emergency department sample will be published in April 1994, but NCHS does not plan to conduct any specific analyses of variables for groupings of pediatric cases.

The IOM report says "inadequate EMSC data systems make it difficult to conduct the planning, evaluation, and research that are needed to determine whether children are getting the emergency care they need, when and where they need it." Part of this inadequacy stems from the difficulty administrators, planners, and other users have in accessing the increasing wealth of data generated by EMS data systems. Many States collect hundreds of thousands and even millions of computerized records from EMS run reports. Ironically, many of these States are so buried in the data and the data collection process that the information in the data bases is unused and thus wasted. Similarly, many people would like to procure certain parts of these data bases or explore the data for a multitude of purposes but find the data extraction mechanisms too difficult to access, too slow, or too inflexible. Modern data base technology and commercially available natural-language (conversational-like English) data base querying could solve these EMS data access problems, but these methods have not been applied to data bases on reports of EMS runs.

GOALS AND OBJECTIVES: The first component of this project entails a child- and adolescent-specific analysis of 3 years of the NCHS emergency department survey data. This analysis will be compiled in booklet format to create the first national picture of pediatric emergency department patient characteristics, causes, diagnoses, and disposition. This "data book" will be disseminated nationally and targeted toward EMS practitioners, clinicians, injury control professionals, and others interested and involved in pediatric health services.

To address the EMS data base access problem, the project will create, test, and evaluate a prototype natural-language interface to an existing EMS run report data system. This prototype will include the capability to access many of the elements of the minimum standard data set developed recently by a National Highway Traffic Safety Administration consensus conference. This software will allow users to type queries on their computers in conversational English to obtain relevant data. For example, one would type: "How many children under the age of 18 in Allegheny County with bicycle-related injuries were transported between 6 p.m. and 11 p.m. in 1992? Show a pie chart of the gender distribution."

METHODOLOGY: To conduct the analysis of the NCHS survey data, 3 years of public use data tapes from the 1992–94 Ambulatory Emergency Department Medical Care Survey will be purchased. The injury data will be enhanced by the addition of a severity index (ICD-9CM to AIS crosswalk) and injury category cost modeling (derived from the 1987 National Medical Expenditure Survey). The data set will then be analyzed from the pediatric EMS perspective. This analysis will be used to prepare, in consultation with several national experts and organizations, a data book complete with photos, tables, charts, graphs, and narratives. The data book will be distributed in print and electronic form to EMS practitioners, clinicians, hospital administrators, public health officials, and others. The project will also highlight the need for State-specific emergency department data and will encourage expansion of the ongoing NCHS survey to be more relevant and to include linkage to prehospital care issues.

A natural-language interface will be developed and applied to the Pennsylvania EMS Ambulance Run Report data base. A commercial software package called Natural Language and associated hardware will be purchased and adapted to the variables in the Pennsylvania EMS data system to allow conversational English access to administrative, demographic, treatment, and incident data elements.

EVALUATION: The data book will be evaluated through a reader response card. Reader satisfaction will be rated in several areas such as content, display, usability, completeness, and audience appropriateness. Distributions will be tracked to analyze orders by geographic location, profession, and date.

After development and testing, user satisfaction with the natural-language interface will be evaluated from the perspective of current users of the data base. Written questionnaires and personal interviews will be conducted to ascertain interest, satisfaction, and expected use and utility of the new query system.

Statewide Drowning Prevention Through the Washington State Emergency Medical Services and Trauma Systems

Washington State Department of Health
Office of Emergency Medical Services and Trauma Systems
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2725 Harrison Avenue, NW, Number 500
Olympia, WA 98504-7853
(206) 526-2599 or 705-6704
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EMSC
MCH-534002
10/01/94–09/30/96
Project Director(s):
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Kathy J. Williams

PROBLEM: In the State of Washington during the 11-year period from 1980 to 1990, drowning ranked first among causes of unintentional injury death for children under 5 years of age, second for children ages 10–19, and third for children ages 5–9. On the basis of data from 1989–91, drowning is the second leading cause of injury death for children under 5 years of age and the third leading cause of unintentional injury death for children ages 5–19. From 1989 through 1991, 100 of Washington State's children under the age of 19 died from unintentional drowning. While the overall drowning rate has been decreasing in the State, pediatric drownings have not, and the rate is considerably higher than the national average. In 1992, the most recent year of statewide data, 42 children ages 0–19 died by drowning.

In Washington the many lakes, rivers, miles of coastline, and irrigation canals make drowning in open water the major risk. Open-water drowning has not previously been addressed by prevention efforts, yet it is a problem in many States. To date, national efforts and those of other States have, for the most part, addressed only pool drownings. Washington can no longer ignore its problem of open-water drowning and near-drowning among children.

GOALS AND OBJECTIVES: The goal of the project is to decrease the mortality and morbidity of children ages 0–21 years due to submersion incidents in Washington State over a 2-year period. The objectives to accomplish this goal are to:

1. Establish community-based drowning prevention programs across the State focused on one or more of the three drowning risk areas—boating, open water, and pools, spas, and hot tubs;
2. Disseminate water safety educational materials to children and their parents;
3. Increase life jacket use by children; and
4. Integrate drowning prevention into the State Emergency Medical Services/Trauma System (EMS/TS).

METHODOLOGY: Washington State's EMS/TS, located in the State's Department of Health, is the lead agency for this project. The Prevention and Systems Analysis Section of the State EMS/TS has an injury prevention specialist who works with the State's eight EMS/TS regional councils to implement injury prevention programs. Children's Hospital and Medical Center in Seattle, WA, is a partner in the project because of its medical expertise in drowning and the success of its Stay On Top of It program for child drowning prevention.

Drowning prevention program coordinators will be hired for each of the State's eight EMS/TS regions. Community-based coalitions will be developed to disseminate information. An age group will be targeted for an increase in lifejacket use and drowning prevention strategies will be implemented.

Existing EMSC project materials from other States will be used whenever possible. Existing water safety materials from Children's Hospital will be disseminated to the regional programs so they will not have to

develop materials. In addition, educational materials will be developed for adolescents and for Hispanic and Native American populations, since essentially no educational materials exist for these groups. The actual methodology of distributing these materials will be determined at the local level, involving the coalition members.

Children's Hospital has a popular loan program and a discount coupon program to lower the cost of life vests. These will be expanded statewide through the regional programs.

The State's existing EMS/TS infrastructure will be used to expand and solidify injury prevention efforts within the State office and the regional councils. This will be accomplished by involving EMS/TS providers in the regional drowning prevention program activities.

EVALUATION: Process evaluation criteria will measure movement toward the objectives. Outcome evaluation for a 2-year project cannot be based on mortality and morbidity data, because submersion incidents are relatively infrequent. A period of at least 5 years of steady decline in mortality and morbidity is necessary. Therefore, each objective will be measured as a proxy that its positive accomplishment contributes toward the project's ultimate goal. The outcome of objective 1 will be shown by evidence of development of the regional programs to include a coordinator, coalition, and goal and objectives with an implementation plan. Objective 2 will be measured with a survey tool developed to show knowledge change in parents and children from before each regional program begins prevention promotion activities, to the end of the first water season, and then to the end of the second water season (end of the 2-year project period). To measure the outcome of objective 3, a tool will be developed to show change in the number of children wearing life jackets in boats and near open water, from a baseline measurement before each regional program begins prevention promotion activities, to the end of the first water season, and then to the end of the second water season (end of the 2-year project period). The outcome of objective 4 will be shown by evidence of EMS providers' involvement in the regional programs.

RESEARCH GRANTS

Specialized Family Emergency Room Program with Suicide Attempters

Research Foundation for Mental Hygiene
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EMSC
R18-MH48059
09/01/90–08/31/95
Project Director(s):
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PROBLEM: Studies indicate that fewer than 25 percent of adolescents who have attempted suicide attended five or more sessions of outpatient treatment in the year following the attempt. Estimates of the number of adolescents failing to attend or complete even brief courses of outpatient treatment after a suicide attempt range as high as 90 percent. The researchers believe that significantly more adolescents and their families will accept the treatment offered after they have experienced the specialized intervention in the emergency room.

GOALS AND OBJECTIVES: The primary goal of the program is to increase the followup mental health treatment adherence by suicidal adolescents and their families by (1) improving staff attitudes toward families, and (2) educating families within the emergency room setting about the importance of followup mental health treatment. Secondary goals are to (1) increase rapport between emergency room staff and families, (2) change families' expectations of therapy, and (3) make attempter adherence to followup mental health treatment an explicit objective of all staff interactions with the adolescents and their families.

METHODOLOGY: This project evaluates the effectiveness of a specialized emergency room family intervention for a consecutive series of 200 (predominantly black and Hispanic) female suicide attempters 12–18 years of age. Female suicide attempters will receive either standard emergency room care plus brief family therapy (control group) or a specialized emergency room program and brief family therapy (intervention group). The specialized program will include: 90-minute crisis intervention with the family; a brief videotape about what families can expect in therapy; and training for emergency room, child psychiatry, and adult psychiatry staff in issues concerning adolescent suicide.

The program has three primary components, developed through focus groups with adolescents, their families, and providers from each discipline (pediatric psychiatry fellows, pediatric residents, emergency room nurses, emergency room patient representatives, and security officers).

1. Emergency room staff received training using the manual developed by the project directors. Individual workshops targeted each discipline involved in interactions with adolescents and their families in the emergency room. Workshops were designed to provide a general overview of the course of treatment of suicidal adolescents from point of entry to the emergency room. In addition, the concerns and interests of each discipline were specifically addressed in preworkshop focus groups, and each discipline received a specialized training module. The goals of these workshops were to provide a general overview of the treatment of a suicidal adolescent, as well as to improve the attitudes of emergency room staff toward the adolescents and their families and toward immediate treatment. Approximately 55 Columbia Presbyterian Medical Center (CPMC) staff have received the training.
2. A 20-minute videotape was developed to encourage both adolescents and their parents to participate in the specialized outpatient treatment. The videotape follows two adolescents through the emergency room and provides information about what to expect and about the rationale for treatment. The videotape depicts the initial emergency room-based treatment session and explains that a brief course of treatment will follow the emergency room visit. This point is reinforced by the emergency room-based case manager during the initial session immediately following presentation of the videotape. Originally filmed in Spanish and then dubbed in English, the videotape follows the format of a Spanish soap opera.

3. A bilingual crisis social worker is on call 24 hours a day. As soon as an attempter comes into the emergency room, the social worker serves as a liaison with the family, provides emotional support, conducts an initial treatment session, and works to reduce anxiety. The social worker shows the videotape and discusses it with the attempter and family, and serves as a link between the emergency room and the followup treatment clinic.

EVALUATION: The number of suicide reattempts and suicide-related risk factors will be assessed at 3, 6, 12, and 18 months. Data analyses for the entire sample are currently underway. Preliminary analyses for the first 125 subjects, however, revealed that female attempters in the intervention group were more likely to return to the clinic for at least one session, attended more therapy sessions, on average, and were less likely to have their cases closed for noncompliance than were attempters in the control group. On average, the intervention was associated with an increase of approximately 20 percent in the amount of treatment received and a decrease of 60 percent in the number of patients failing to return to the clinic for any treatment at all. This study demonstrates that an emergency room-based intervention can have a positive impact on the amount of followup treatment received by female adolescent suicide attempters and their families. The importance of family factors, as both precipitants of suicidal behavior in adolescents and determinants of treatment adherence and outcome, has been demonstrated in the literature. Including other family members, especially mothers, as primary targets of both the emergency room-based intervention and followup treatment may have played an important role in the success of the program.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. The project has developed the following materials: The manual for staff training, the videotape entitled *New Beginning*, and *Successful Negotiations/Acting Positively*, a therapy manual focusing on cognitive and behavioral family therapy.
2. Manuals for emergency room staff treating suicidal adolescents and their families were distributed to training staff within the Columbia Presbyterian Medical Center. In addition, manuals were distributed at a number of presentations and workshops that outlined the intervention. To date, providers of emergency medical services (EMS) and emergency medical services for children (EMSC) have not received training using the manuals; however, training workshops would present an ideal forum for training these providers. Approximately 350–400 manuals have been distributed to pediatric psychiatry fellows, pediatric residents, emergency room nurses, emergency room patient representatives, security officers, and others.
3. Preliminary analyses of the first 95 subjects in the control group have identified a number of baseline factors related to treatment adherence. Increased levels of adolescent ideation and adolescent and maternal depression and positive parental attitudes toward treatment all showed a significant positive relationship to the number of treatment sessions attended. Adolescent ratings of poor family adaptability were negatively related to the number of sessions attended. Maternal depression and single-parent family status were positively related to completion of the six-session treatment protocol, while age was the only significant predictor of a return to the clinic for any treatment following the initial emergency room evaluation.

Pediatric Prehospital Critical Care Skills Retention
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Research
MCJ-410649
10/01/94–09/30/96
Project Director(s):
Eustacia Su, M.D.

STATEMENT OF THE PROBLEM

Optimal care of critically ill or injured children in out-of-hospital settings depends on the knowledge and skills of the emergency medical technician-paramedic (EMT-P). Pediatric emergencies, however, represent a very small fraction of EMT-P calls. Limited exposure to pediatric emergencies may result in the deterioration of necessary knowledge and skills.

RESEARCH QUESTIONS OR HYPOTHESES

This study aims to assess knowledge of pediatric resuscitation and deterioration of skills over the 12-month period following a pediatric resuscitation course, and to determine the effect of ongoing clinical experience and re-education on the deterioration in skill levels.

Specifically, the project will determine (1) the frequency with which EMT-Ps are exposed to specific pediatric emergencies, (2) the effect of ongoing clinical experience on knowledge and on skill deterioration, and (3) the effect of re-education and/or testing on knowledge and skill deterioration.

STUDY DESIGN AND METHODS

We plan a prospective assessment of the test/retest performance of EMTs who have just completed the Oregon Pediatric Prehospital Critical Care Course. Participants will be assigned randomly to one of four continuing education groups. The groups will be retested on knowledge (written examination) or skills (mock resuscitation examination) or both, at 6 and 12 months. This design will allow us to measure separately the effects of nonintervention, traditional testing only, mock resuscitation testing only, and both modes of assessment on knowledge and skill retention. The effect of clinical exposure to critical pediatric cases will be evaluated as a potential confounder.

Cost Effective ED Screening for UTI in Febrile Children

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Philadelphia, PA 19104
(215) 590-1944

Research
MCJ-420648
10/01/94–09/30/96
Project Director(s):
Kathy Shaw. M.D.

STATEMENT OF THE PROBLEM

Emergency department physicians should have a low threshold for screening for urinary tract infection (UTI) since it is often present (even in children with an equivocal alternative source of fever such as viral illness or upper respiratory infection) and its sequelae are severe. While there is little consistent information about the prevalence of UTI among febrile pediatric patients in the emergency department, there is much debate about the most appropriate clinical and laboratory criteria for diagnosis. Currently, screening is uncomfortable for patients and its costs are significant.

RESEARCH QUESTIONS OR HYPOTHESES

This project will undertake a prospective study of febrile infants < 1 year of age and febrile girls ages 1–4 years in a high-volume urban pediatric emergency department. The study aims to (1) determine the prevalence of UTI; (2) determine the usefulness of rapid screening tests for UTI; and (3) identify clinical predictors and develop clinical prediction models to stratify children at high risk for UTI.

Using information from the prospective study, published reports, and a modified Delphi survey of pediatric emergency department physicians, nephrologists, infectious disease experts, and urologists, the project will create a decision analysis model to determine cost-effective strategies for UTI screening in evaluating febrile young children in an emergency department setting.

STUDY DESIGN AND METHODS

This prospective cross-sectional concordance study will enroll all febrile infants < 1 year and febrile girls ages 1–4 years (excluding those with an unequivocal source of fever) consecutively over a 2-year study period in the Emergency Department of The Children's Hospital of Philadelphia. The primary outcome measure for the study will be a positive urine culture. Clinical predictors will be obtained by the nurse or examining physician using a pretested standardized data collection form. Interobserver reliability will be measured. The sample population will be characterized and prevalence rates determined. Sensitivity, specificity, and predictive value will be calculated for urine dipstick results performed on nonsterile urine obtained by urine bag and for enhanced and conventional urinalysis and dipstick on urine obtained under sterile conditions. The clinical prediction models, derived from multiple logistic regression, will be evaluated as a diagnostic test, using Receiver-Operator Characteristics curves.

A cost-effective decision analysis study will be conducted and will incorporate findings from the prospective study, medical literature, and expert opinion.

The study will help guide individual emergency department practitioners, institutional providers, and policymakers in reaching cost-effective management decisions about evaluation of the febrile young child for UTI, which is one of the most prevalent problems in pediatric emergency care.

CONTINUING EDUCATION GRANTS

Midwest Regional Childhood Injury Prevention and Control Conference
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EMSC
MCT-209411
10/01/94–09/30/96
Project Director(s):
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Ronda G. Barrett

PROBLEM: Injuries are the leading cause of death for children and youth ages 1–19 in the United States. According to the National SAFE KIDS Campaign, nearly 8,000 children ages 1–14 die from preventable injuries each year and another 50,000 are permanently disabled. Intentional injuries are also increasing. Christoffel found that for the years 1985–89, there was a 25-percent increase in firearm-related deaths of children ages 1–19, including deaths from homicides and suicides as well as unintended deaths. For Region VII in 1992, the leading causes of injury death for children ages 0–19 were motor vehicle collisions, followed by homicides and suicides. Injuries are often viewed as "accidents" or acts of fate over which parents and their children have no control. As a result, the issue of childhood injury has not received the attention necessary to effectively implement intervention strategies.

This regional conference will focu· .ttention on both intentional and unintentional injuries that lead to the death and disability of our youngest citizens. It will address seven of the *Healthy People 2000* objectives that relate to childhood injury. National and regional experts in the areas of injury prevention and control will present current research on childhood injury and effective intervention programs. The program will offer continuing education for maternal and child health (MCH) professionals working in public, private, and voluntary settings at the State and local levels and for other injury prevention professionals such as community mental health workers and law enforcement, fire, and emergency personnel. Participants will explore strategies for prompting local collaboration and grassroots activity and network with professionals from other disciplines. In addition, the opening sessions of the conference will include a live satellite uplink with downlink to 20 sites in each State with a targeted minimum attendance of 25 MCH and other related professionals at each site in Kansas, Missouri, Nebraska, and Iowa. A multicultural perspective will be provided so that conference participants will gain an understanding of injury prevention issues and their effect on all residents of our communities.

GOALS AND OBJECTIVES: The goal of the Midwest Regional Childhood Injury Prevention and Control Conference is to increase knowledge, skills, and abilities necessary to reduce childhood injuries in the Region VII States and communities. This conference will provide an opportunity for professionals who work with mothers and children to collaborate on strategies for childhood injury prevention. The conference will disseminate and discuss current research on intentional and unintentional injuries. It will create an arena where MCH professionals, law enforcement professionals, and fire and emergency personnel will begin or expand on collaborative efforts in their communities.

At the completion of this conference, participants will be able to:

1. Describe the most frequently occurring injuries in Region VII;
2. Discuss the impact of injury on the population served;
3. Identify prevention strategies that professionals could use in their work settings;
4. Discuss the role that substance use and abuse play in injury; and
5. Describe ways to encourage complementary disciplines in the participant's home community to join in injury prevention efforts.

METHODOLOGY: This conference will focus the attention of MCH professionals and law enforcement, community mental health, fire, and emergency personnel on the area of intentional and unintentional childhood injury. During the 2-day conference, researchers and injury prevention professionals will present current

research and program strategies on injury prevention. Each day will include a plenary session with speakers of regional and/or national prominence. Day 1 of the conference will provide a long-distance learning program with a live satellite uplink of the plenary sessions and anticipated downlinks to school districts and hospitals in the four-State area. Concurrent sessions in the afternoons will feature speakers and/or panels who will discuss research and exemplary programs on various types of intentional and unintentional injury. The conference faculty will include invited presenters, submitted presenters, and invited panels. Examples of concurrent sessions include intentional injuries such as suicide, homicide, and assaults; farm injuries; water safety; firearm injuries; and incorporating alcohol abuse prevention into injury prevention. The final afternoon's concurrent session will consist of 3-hour hands-on, skill-building sessions that will assist MCH personnel in learning to use proven injury prevention strategies such as the Safety Town and Fire Safety House.

Representatives from the four SAFE KIDS coalitions from Region VII, each sponsored by its State health department, have been meeting to discuss the possibility of a cosponsored regional program of continuing education in childhood injury. These SAFE KIDS coordinators typically coordinate activity between their State's MCH and injury control divisions. Working with the SAFE KIDS coalitions in the four States, the University of Kansas Medical Center's Child Development Unit/Kansas University Affiliated Program and the Division of Continuing Education, University of Kansas, would offer an educational program on unintentional and intentional childhood injury and apply for continuing education credits in the nursing, social work, child care, medicine, law enforcement, paramedic, and emergency medical technician disciplines. A contract for video uplink production will be made with another Kansas Regents institution, Kansas State University. Volunteers from SAFE KIDS coalitions from Nebraska, Iowa, Kansas, and Missouri will assist in selecting the program and the overall planning committees for this continuing education conference. The coalitions will also assist with publicity in their States.

EVALUATION: The evaluation for this continuing education program must meet the criteria of multiple accreditation organizations. The course evaluation will rate the overall conference and long-distance learning programs for course content, registration procedures, and course location. Evaluation will include asking whether the conference goals and objectives were met. In addition, the presenters of concurrent and plenary sessions will be evaluated. Participants will be given the opportunity to submit written comments on the presenters, facilities, breaks, and so on; suggestions for improvement of future programs; topics of interest for future programs; and general comments about the program.

Intermountain Regional EMSC Coordinating Council Continuing Education Conference
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EMSC
MCT-499403
10/01/94–09/30/96
Project Director(s):
J. Michael Dean, M.D.

PROBLEM: The Intermountain Regional EMSC Coordinating Council (IRECC), formed during funding of the Utah EMSC Demonstration Project, consists of the eight States of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming; IRECC meetings have also been attended by representatives from Oregon, South Dakota, Washington, and Texas. In March 1994, IRECC defined two major goals for the next 3 to 5 years: (1) Define the epidemiology of emergency medical services for children (EMSC) in the intermountain region; and (2) identify all injury-related interventions in the region, and assess the effectiveness of these interventions. IRECC also defined specific objectives aimed at accomplishing these two major goals.

It has become clear to IRECC participants that their ability to carry out these goals is limited by two factors: (1) Most of the IRECC participants do not have a significant research background. Indeed, there are technical gaps in knowledge with respect to epidemiology, injury prevention strategies, injury cost analysis, research design, and statistics (particularly the multivariate techniques needed for outcome research); and (2) EMSC programs are not totally integrated into other State-level maternal and child health (MCH) programs or other State agencies. For example, EMSC programs are currently involved in injury prevention strategies in several intermountain States. These efforts will be strengthened by coordination with and involvement from injury prevention programs funded by the MCH Block Grant.

GOALS AND OBJECTIVES: The project's two major goals are to:

1. Increase the expertise of the IRECC participants in the areas of epidemiology, injury prevention strategies, statistical analytical techniques, and data linkage methodologies. These individuals would also be made more knowledgeable about State MCH programs, programs for children with special health needs (CSHN), and other Title V programs. This information will help IRECC members to better understand technical aspects of the IRECC's initial goals (mentioned above) and will improve cooperation, coordination, and integration within individual States. This will allow IRECC participants to begin structuring detailed steps toward accomplishing all the objectives of IRECC.
2. Increase knowledge about EMSC among State-level individuals who have not previously been involved in regional EMSC activities. Such individuals may include State epidemiologists, injury prevention and school health specialists, parent-teacher associations, State hospital association leaders, rural health agencies, the Indian Health Service, legislators, educators, and individuals working within State MCH and CSHN programs and other Title V programs. Other important individuals to include are pediatricians, family practitioners, and nurses (office, emergency department, and school). This information will facilitate networks within individual States and the region with MCH and Title V programs, permitting IRECC objectives to begin operation at the State and regional levels.

These goals will be accomplished with three distinct annual conferences. In year 1, spring 1995, a conference will be held for 30 students. The target audience will be EMSC experts, IRECC participants, and Utah MCH personnel. IRECC participants will include all eight IRECC States. Because of previous IRECC participation, representatives will be invited from Oregon, South Dakota, Texas, and Washington. The purpose will be to increase EMSC experts' knowledge of epidemiology, research, design, injury cost analysis, trauma severity scoring, injury prevention techniques, statistical analyses, multivariate modeling, health outcomes research, data base linkage (probabilistic), and MCH and Title V programs.

Forty students will attend each of the conferences held in years 2 and 3, spring 1996 and 1997. The target audience will be non-EMSC experts, including individuals working in MCH, other Title V programs, school nurses, legislators, pediatricians, family practitioners, educators, injury prevention specialists, nurses, and State epidemiologists. The audience will be restricted to Colorado, Idaho, Montana, and Wyoming in year 2. The audience will be restricted to Arizona, Nevada, New Mexico, and Utah in year 3. The purpose will be to increase the knowledge of non-EMSC experts in various areas of EMSC, including the size and seriousness of the injury problems in childhood, the years of potential life lost from childhood injuries, the effect of EMSC on reducing injury mortality and morbidity, the educational needs of EMSC providers, the costs of childhood illness and injury, available curriculums, the Institute of Medicine report on EMSC, and national funding opportunities in EMSC. All the EMSC programs in the region will present summaries of State accomplishments during their funding periods.

METHODOLOGY: The specific curriculums for the first conference will be finalized and approved by the participants from Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, South Dakota, Texas, Utah, and Wyoming who attended the IRECC meeting in September 1994 in Colorado. At that meeting, the precise timing of the spring 1995 meeting will be determined in order to avoid conflict with regional emergency medical services (EMS) meetings and the national EMSC meeting.

The specific curriculums for the second and third conferences will be developed by all eight IRECC States, with particular attention from the target States for each conference. The purpose of these meetings is to build networks with non-EMSC individuals, and the timing of these meetings will be planned with regional sensitivity in order to achieve maximum attendance by the target audiences.

The specific curriculums for these conferences are not completely defined. However, possible topics and time allocations for each conference are as follows:

Year 1, spring 1995: Summary of Title V programs in the region, 2 hours; epidemiological principles for EMSC applications, 3 hours; injury severity scoring systems (ISS, AIS), 2 hours; injury cost analysis, 3 hours; data base linkage methodology (probabilistic), 2 hours; developing realistic research questions, 2 hours; interpretation of vital statistics data, 1 hour; effect of seatbelt overreporting in motor vehicle crashes, 1 hour; effective research design, 2 hours; public policy and advocacy, general approaches, 2 hours; structure of MCH program nationally, regional resources, 1 hour; and use of the Centers for Disease Control and Prevention Wonder program, 1 hour.

Years 2 and 3, spring 1996 and 1997: Summary of Institute of Medicine report, 3 hours; pediatric training of regional EMS personnel, 2 hours; review of the EMSC programs in each State, 6 hours; curricular materials developed by regional EMSC programs, 3 hours; EMSC legislative experiences in the region, 2 hours; EMSC data bases in the region, 1 hour; outcome from EMSC care, 1 hour; patterns of EMSC care in the region, 1 hour; State-specific workshop sessions, 2–3 hours; public policy and advocacy, specific State-level approaches, 2 hours; and differences between children and adults, EMSC as part of EMS, 2 hours.

Since this project focuses on the EMSC efforts of eight States, the conferences will be closely coordinated with IRECC. This organization includes the EMS directors of each of the States or the State EMSC project directors. The conferences will be closely coordinated with the director of family health services in Utah, who oversees the MCH programs in Utah. As noted above, the curriculum for each meeting will be designed by IRECC with active help from the director of family health services.

EVALUATION: Each conference will have a detailed pretest and posttest, which will permit an evaluation of how well each conference and component educational activity has achieved its predefined educational objectives. Evaluation results will be used to alter faculty or methods of informational delivery as appropriate.

There will also be a detailed evaluation of each meeting by the participants, dealing with issues of perceived value of the conference in total, details concerning the site of the conference, and other mechanical issues related to the meetings.

Finally, there will be a 6-month followup with each of the participants by questionnaire to determine if the conference has had a lasting impact on the professional activities of the participants. For example, each participant in the first conference may consider the session on research design to have been superbly conducted,

but it will be of interest to know if anyone is using the concepts 6 months later. The evaluation will also assess networking that has resulted from the conferences, in order to determine lasting impact on cooperation between EMSC programs and MCH and other Title V programs in individual States. Finally, the evaluation will examine whether the conferences have contributed to cross-State cooperation in EMSC or MCH programs related to EMSC.

COMPLETED EMSC PROJECTS

Demonstration Projects for Pediatric EMS Systems Components

University of South Alabama College of Medicine
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EMSC
MCH-014001
02/01/86–01/31/89
Project Director(s):
Lynn Davidson, M.D.

PROBLEM: The main goal of the Alabama emergency medical services for children (EMSC) project has been to identify essential components necessary for the emergency care of the acutely ill or injured child. Seven subprojects evaluated key aspects of these necessary components and demonstrated a composite system for pediatric emergency care which is applicable to any area of the United States wishing to integrate an EMSC system into the current adult-oriented systems.

GOALS AND OBJECTIVES: The objectives of the Alabama project were designed to cover the full continuum of emergency medical services for the child, from prevention of injury to rehabilitation. If we are going to truly impact on pediatric trauma mortality, we must involve ourselves in all phases of injury control. One of the objectives of this project was to decrease morbidity and mortality in children involved in motor vehicle collisions by promoting the use of appropriate child restraint methods, and to increase compliance with State laws regarding such restraints. A second preventive objective was concerned with recognizing the intentionally injured child and providing appropriate notification to child protective services.

Emergency transport of the critically ill child to a regional pediatric center is an integral function of an EMSC system. A major objective of the project was to define the characteristics and needs of the population served by transport, to elucidate the transport modalities that must be available in an EMSC system, and to verify system effectiveness by monitoring outcome variables for each child accessing the system. Educating the public, the prehospital care provider, and the rural physician about the assessment and management of pediatric emergencies are important components of an EMSC system, and educational models were developed by the Alabama project to address each of these populations. The positive impact of rehabilitative services on patient outcome has been well established and must be considered part of the trauma care continuum. The final goal of the Alabama project was to establish a matrix of currently available rehabilitative services for the injured child, based on the perception of those using them.

METHODOLOGY: The subproject demonstrating injury prevention objectives conducted an extensive public education campaign aimed at law enforcement officials, parents, and elementary school children, whereas the subproject evaluating the intentionally injured child surveyed emergency department records of children presenting with specific injury patterns and medical conditions. Evaluation of transport of the critically ill child utilized a comprehensive, regional data base reflecting multiple comparisons between air and ground transport modalities for children accessing the emergency medical services (EMS) system. The educational subprojects developed curriculums and teaching methods on assessment and management of pediatric emergencies appropriate for three different levels of providers—the parent, the prehospital professional, and the primary care physician and nursing staff. A matrix of available rehabilitative services was compiled through written questionnaires submitted to participants in the National Pediatric Trauma Registry.

EVALUATION: Each subproject used a unique evaluative method specific to the goals of the project. Educational programs used the increase in knowledge, measured by precourse and postcourse testing. Public education projects used social parameters assessing change in behavior. Data base projects used completeness and accuracy of data collected.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. Results: The overall goal of the Alabama EMSC project was to demonstrate effective models for the necessary components of an EMSC system and the integration of those components into currently operating adult-oriented systems. It is now possible to outline the six major components of an EMSC system: (l) System description, (2) prevention, (3) education, (4) standards of care, (5) quality assurance, and (6) research and development. The subproject investigating transport modalities serves as a model for system design by designating the needs of a regional system and describing the factors that must be inherent in the system to meet those needs. An EMS system must provide the mechanism to prevent unintentional injury and death, and the subprojects on childhood restraints and intentional injury demonstrated viable models for incorporating prevention into the EMS system. Educating professionals and the public and establishing treatment protocols are key components in the success of an EMS system, and the Alabama project has demonstrated workable educational programs that can be readily incorporated into the adult-oriented EMS systems, thus promoting the knowledge and protocols necessary to assess and manage the critically ill child. Quality of the system is assured by a data base that analyzes outcome variables with a variety of prehospital interventions including field treatment and transport modalities, and subserves the research and development component by maintaining the system at an up-to-date level of performance.
2. Dissemination, utilization, and followup: The results of the transport subproject have provided the data necessary to quantify the needs of the region and the EMSC system necessary to meet those needs. The educational subprojects promoted the concept of specialized training in pediatric emergencies and have been integrated, with some modification, into the educational network of the State EMS system. The model developed for prevention of injury to children in motor vehicle collisions demonstrated the utility and effectiveness of an intensive public awareness campaign and will be duplicated for other prevention topics. Data collected for rehabilitative services have prompted the formation of a task force on the needs of the technologically dependent child, and data on intentionally injured children have influenced the initiation of a multidisciplinary child protection team in the community.
3. Replication: Easily adaptable to any rural/urban EMSC configuration, the project requires, at minimum, a core group composed of a medical director, paramedic, and clerical assistant. Depending on the resources of the region's EMS system, operating costs may easily be integrated into the annual budgets of the currently operating systems.

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EMSC
MCH-024001
10/01/89–09/30/92
Project Director(s):
Mark S. Johnson, M.P.A.

PROBLEM: This project addresses the problems of pediatric emergencies in Alaska through interventions at various stages of disease and injury affecting children, and the system that is designed to combat these problems.

GOALS AND OBJECTIVES: The overall goal of this project is to improve the emergency medical care system in Alaska and its ability to treat and rehabilitate Alaska's acutely ill and injured children, as well as to prevent childhood injuries and deaths. The project addresses deficiencies in the emergency medical services (EMS) system at all levels—prehospital, hospital, and rehabilitative services.

METHODOLOGY: The project implemented the following activities:

1. Prehospital level: At the prehospital level, pediatric emergency care instruction has been emphasized. By the end of the second project year (September 30, 1991), a 2-day pediatric emergency care course and individual course modules were provided to more than 1,000 EMS and health care personnel in rural communities and cities through the State. Most of this training was provided by 74 instructors who completed a 3-day pediatric emergency care instructor course during the first year of the project. Many of these instructors live in rural communities and can provide less costly and more relevant instruction directly to their own areas than centralized instruction could provide.

   In addition, three preceptorship programs have been developed. The first program offered the opportunity for registered nurses, nurse practitioners, and physician's assistants to work in a large hospital for 5 days or more. The program enabled these practitioners, many of whom are from rural areas, to increase their experiences and skills in treating pediatric injuries and illnesses. The program included a number of self-study modules and evaluation components.

   A second preceptor program, designed specifically for physicians and registered nurses, offered out-of-State advanced training in pediatric emergency care. (Training in various areas of pediatric care is not available in Alaska.)

   The third preceptor program was designed for emergency medical technicians (EMTs) at all levels, as well as for paramedics. The program involved 20–24 hours of assessment and hands-on experience with care of pediatric patients in hospitals and clinics throughout the State. This program also included self-study modules and evaluation components.

   Another prehospital component of the program, developed during the second year of the project, involved injury prevention. Five injury prevention projects were funded, and two additional projects will be funded during the project's third year. Two projects targeted the Anchorage metropolitan area, which comprises approximately half of the State's population. One project targeted the North Slope Borough but included development of materials for statewide use. The remaining four projects were designed for statewide use. The projects address the following issues: Drowning; use of bicycle helmets, snowmobile helmets, and seat belts; installation of smoke alarms; firearm safety; accessing the emergency medical services system; injury prevention among foster families; and a variety of issues focusing on local needs (presented as part of a traveling robot ambulance program).

The Alaska State EMS Section also received an injury prevention/control grant from the Centers for Disease Control and Prevention (CDC). Staff from the EMSC project and the prevention/control grant worked closely together on childhood injury prevention efforts.

Because of the vastness of the State and its numerous isolated rural villages, many pediatric emergency patients spend considerable time in rural clinics waiting to be transported, usually by air, to higher level facilities and hospitals. To address these issues, the *Alaska State Medevac Manual: Guidelines for Medevac Escort* is being developed for distribution in early 1992 to all EMS air transport services in the State.

2. Hospital level: The project also included a survey of pediatric capabilities of ambulance and first responder services, rural community health aide clinics, and hospitals in the State. The survey of ambulance/first responder services and community health aide clinics focused primarily on the availability of pediatric emergency equipment. Based on this survey, the project purchased and distributed needed pediatric equipment valued at $40,000 to ambulance/first responder services and clinics throughout the State. The project will also purchase and distribute additional equipment valued at $20,000 during the final project year.

   The hospital survey not only assessed the availability of equipment and medicines, but also assessed staff training, staff capabilities, and policies and procedures. Survey results will be compiled, summarized, and distributed in an informational packet to State health care workers as a resource for referral.

   A trauma register has also been developed by this project. During the first 2 years of the project, the trauma register evolved from pilot phase to an injury surveillance system that includes collection of data at each of Alaska's 25 acute care hospitals. Analysis of trauma register data will have major policy implications for the emergency care provided to children in Alaska.

   The project also included the compilation of 1990 data on medical and trauma admissions of children to hospitals. This compilation involved 12 of the 15 hospitals in the State with computer capabilities. Analysis of data will provide a clearer picture of the types of injuries and illnesses affecting children in Alaska, as well as information on the sites where these injuries and illnesses occur. The results are expected to have policy implications for the emergency care and injury prevention programs provided to children in Alaska.

   Finally, at the hospital level, a hospital-oriented pediatric advanced life support (PALS) course entitled "Beyond PALS" is being developed. Materials from similar courses developed by Florida and Arkansas EMSC projects will be combined with other course materials to produce a curriculum and student manual focused primarily on needs of rural physicians and nurses. This course will be available to each of Alaska's hospitals free of charge for the first presentation and for a nominal fee thereafter.

3. Rehabilitative services level: Treatment of severely injured or ill children often does not end with discharge from the hospital. Home care and rehabilitative care is frequently necessary. To ensure adequate care, especially in rural areas of the State, the Alaska project included development and implementation of a discharge planning program. The program has developed the following: A tracking system to identify children at risk; a uniform discharge planning process for the five hospitals providing services to most of Alaska's pediatric patients; an educational presentation for health care workers on discharge planning; a Parent Resource Guide for parents of special needs children to assist them in locating, evaluating, and securing health care resources for their children; and a discharge planning manual.

   The EMSC project activities address a range of needs. This effort was made possible in two ways: First, health care personnel throughout the State volunteered many hours to assess pediatric needs and to direct various components of the project. They developed standards and guidelines; wrote, reviewed, and edited materials for newsletters, manuals, and instructional curriculums; and taught classes.

   Second, the combined efforts and funding of the EMSC project and the injury prevention/control grant allowed much to be achieved in the area of child injury prevention. Staff from the two projects coordinated efforts and combined funding to support overall State injury prevention planning as well as specific projects.

EVALUATION: Pretests, posttests, and student evaluations of courses and instructors are being used to evaluate the pediatric prehospital care course, two of the three preceptorship programs (excluding the advanced preceptorship program), six of the seven injury prevention projects, and the "Beyond PALS" course. The pediatric prehospital care course also included a 6-month posttest given to randomly selected students.

The medevac manual will be evaluated through its level of use. The evaluation of the trauma register is based on the number of reports provided to hospitals, the use of those reports for quality assurance purposes, and the number of requests for information and data for educational, research, and training purposes. The discharge planning component of the project included an initial survey on discharge planning given to all hospitals in the State. This survey will be given again at the end of the project to measure project effectiveness. Distribution and use of the discharge planning manual and the parents' resource manual will also serve to evaluate the success of the project. Finally, the discharge planning component includes quarterly evaluation contacts with participating hospitals.

EXPERIENCE TO DATE: Almost all goals established at the beginning of the project, or added in the second year grant application, have been or will be accomplished by the end of the third project year. Beyond addressing the remaining goals and objectives, the primary focus in the third year is to integrate components of the program into the State EMS system and to integrate the discharge planning component into the program of the Maternal, Child, and Family Health Section of the Division of Public Health.

The following measures will help to ensure program integration into the EMS system:

1. The pediatric emergency care course will continue beyond the end of the project (primarily because of the large number of instructors trained for the course) and will provide continuing education hours to help meet requirements for recertification;
2. The State EMS Training Committee, a subcommittee of the Governor's appointed Advisory Council on Emergency Medical Services, revised the skill sheets used in EMS training throughout the State by adding pediatric-specific skills, making them more appropriate for pediatric patient care, and adding a preface describing their use for pediatric patients;
3. The medevac manual will continue to be used, with periodic updates as needed;
4. The "Beyond PALS" hospital course will become self-supporting after the first presentation to each rural hospital;
5. Injury prevention will remain an integral part of statewide EMS efforts;
6. Efforts to maintain funding of the trauma register component will continue; and
7. Two of the three preceptorship programs will continue after the project has ended.

Finally, the Maternal, Child, and Family Health Section is committed to continuing discharge planning efforts as part of its activities supported by the State General Fund.

The following project materials have been or will be developed: *Pediatric Prehospital Care Instructor Manual, the Pediatric Midlevel Preceptorship Preceptee Notebook, the Prehospital Pediatric Preceptor Notebook, Alaska State Medevac Manual: Guidelines for Medevac Escort,* and the "Beyond PALS" course curriculum.

Demonstration Project: Emergency Medical Services for Children
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EMSC
MCH-054001
10/01/87–09/30/91
Project Director(s):
Debra H. Fiser, M.D.

PROBLEM: The Arkansas Demonstration Project: Emergency Medical Services for Children (EMSC) was funded through the U.S. Department of Health and Human Services, Maternal and Child Health Bureau, as a result of the 1984 Emergency Medical Services for Children initiative. The grant was awarded to the University of Arkansas for Medical Sciences' Department of Pediatrics, affiliated with Arkansas Children's Hospital. The purposes of the project were to evaluate and improve the outcome of pediatric emergencies in Arkansas and to disseminate knowledge and innovations gained from the project to other States.

GOALS AND OBJECTIVES: The project was designed with four primary goals: (1) Increase knowledge of the consequences of emergency illness and injury among Arkansas children; (2) improve the emergency medical services provided to children, particularly children with special health needs and minority children; (3) determine the effectiveness of the proposed methodologies in reducing the morbidity and mortality associated with pediatric emergencies; and (4) identify effective methods of imparting new EMSC knowledge and promoting adoption of effective programs developed by other States.

METHODOLOGY: The Arkansas EMSC system was operationally defined as a cyclic and comprehensive system including the home, emergency medical services (EMS) systems, local medical facilities and personnel, secondary interhospital transport systems, tertiary pediatric facilities, and rehabilitative services. Each component was systematically evaluated, and strategies were chosen to address major deficiencies. A broad-based, regionalized approach was chosen for implementation of subprojects. This approach involved interaction with many statewide agencies, including the various offices of the Arkansas Department of Health and the Area Health Education Centers of the University of Arkansas for Medical Sciences.

EXPERIENCE TO DATE: Specific accomplishments of the Arkansas EMSC Demonstration Project include the following activities, products, and results:

1. Pediatric morbidity/ mortality data collection—system evaluation and monitoring. Initial Arkansas EMSC activities included developing a prospective data collection network with 10 representative Arkansas hospitals. This data base now includes information on more than 10,000 children who experienced an emergent illness or injury in 7 regions of the State. The data have been especially helpful in identifying the types of child emergencies with the highest morbidity and mortality in Arkansas.

   Subsequent data collection focused on more specific populations with increased risk of mortality or morbidity as a result of their pediatric emergencies. To date, studies have included evaluation of potential long-term morbidity in pediatric emergencies; assessment of the impact of a 911 telephone access system on child emergency outcomes; development of a pilot retrospective tracking system for pediatric intensive care unit patients via a portable computer; and definition of a pilot system for quality assurance for secondary critical care transports.

2. Improved professional education in pediatric emergency care. A second major focus of the Arkansas EMSC project was the development of educational courses in Pediatric Advanced Life Support (3 days) for physicians, nurses, and paramedics and pediatric Basic Life Support (2 days) for emergency medical technicians. These courses were taught in seven locations around the State during the spring of 1988 and

have continued to be offered on a regular basis through Arkansas Children's Hospital. The courses have also been videotaped with copies distributed to over 50 regional Area Health Education Center libraries and strategic rural hospitals statewide. The project has also successfully introduced the use of intraosseous infusions by prehospital providers through the development of an instructor training course and intraosseous training materials for prehospital providers.

3. Pediatric emergency care protocols and facility standards. As an adjunct to its health care provider education, the project has developed three sets of algorithms for pediatric emergencies for use by hospital professionals, prehospital paramedics, and prehospital emergency medical technicians. The algorithms for hospital providers were distributed to all Arkansas hospitals in the form of "Child Emergency Packets" for placement with the "crash carts" in each emergency department.

   The prehospital algorithms have been distributed via the State Office of Emergency Medical Services to every licensed ambulance service in Arkansas and have also been shared with interested EMS providers in several other States. Project staff also coordinated development of standards for the use of the intraosseous infusion technique in the prehospital setting and implementation of the technique statewide by Arkansas EMS providers via the State Office of Emergency Medical Services.

   The Emergency Departments Approved for Pediatrics (EDAP) project was the approach used by the State to upgrade the capabilities of local emergency departments to manage child emergencies. Minimum guidelines for pediatric emergency equipment, supplies, and staffing were developed and mailed to every Arkansas hospital, with an invitation to participate voluntarily in the project. Any hospital desiring to participate received a consultative site visit from a pediatric emergency medicine physician. These site visits provided mechanisms for specific suggestions for improvements in local pediatric emergency care. Thirty-four hospitals statewide received EMSC visits. Training has also been completed for Arkansas Department of Health facility review teams on specific pediatric emergency requirements.

4. Improved public awareness of child emergencies. Another initial Arkansas EMSC objective was to increase the public's ability to manage pediatric emergencies. Project efforts included production of a 30-second public service announcement to increase public preparedness for child emergencies (the need for learning infant/child cardiopulmonary resuscitation and first aid, the circumstances under which an ambulance should be called, and the procedures to access the EMS system). This public service announcement has been copied, distributed, and aired by television stations in Arkansas as well as in Texas and Louisiana border communities to reach the maximum number of parents.

   Additional efforts in public education have involved development of a statewide Childhood Injury Prevention Program. Activities have included analysis of Arkansas EMSC child injury data, development of Arkansas SAFE KIDS chapters, community childhood injury prevention campaigns, presentations to State health care providers, media announcements on childhood injury prevention, and participation in the national Year of the Child in Emergency Medical Services campaign.

5. Dissemination and utilization of results. Arkansas EMSC Knowledge, Transfer, and Utilization (KTU) and national EMSC networking activities have included: (1) Providing education and training materials in pediatric emergency care to U.S. Air Force medical personnel from bases in Arkansas and surrounding States; (2) providing education and training materials and consultation to Acadian Ambulance Service, a large rural Louisiana EMS service, for improved training of their EMS personnel in pediatric emergency care; (3) networking with the regionalized health care system in northwest Mississippi to upgrade local emergency departments' capabilities to manage pediatric emergencies; (4) developing and disseminating process models on the various approaches used in Arkansas EMSC activities; (5) disseminating information via scientific meetings, abstracts, and publications; and (6) participating in national EMSC task force groups and the national EMSC conference.

6. Integration and followup: The various Arkansas EMSC activities were developed so that portions could be integrated into existing agencies' future responsibilities. An even greater measure of the project's success, however, is the increased statewide interest and enthusiasm for issues related to the emergency care of children. Several followup programs and proposals have already been generated, especially in the areas of childhood injury prevention and health care provider education in pediatric emergency care. Integral to the success of EMSC efforts in Arkansas were the adequate human and financial resources to initiate, adapt, refine, and incorporate pediatric emergency standards, equipment, and training into existing health care systems at the local level.

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EMSC
MCJ-064002
10/01/91-02/28/94
Project Director(s):
Maureen McNeil

PROBLEM: The California Emergency Medical Services for Children (EMSC) project is a targeted issues project. Its focus is statewide improvement of the pediatric capabilities of local and regional emergency and critical care systems. There is well-documented evidence of major deficiencies among local emergency medical services (EMS) agencies in EMSC planning, personnel training, equipment, emergency department preparedness, access to pediatric critical care and trauma services, rehabilitation, and management of data.

GOALS AND OBJECTIVES: The project has established specific goals and objectives along with specific timelines. The overall project goals are to create a viable "continuum" model for emergency medical services for children, to be carried out in local EMS agencies throughout California. This service continuum includes community medical operations for children, ranging from injury prevention and prehospital care to emergency department and critical care, trauma services, and rehabilitation. The model also includes administrative components to coordinate and manage this continuum, including appropriate use of data and prospective planning strategies.

METHODOLOGY: The project involves product development by 10 subcommittees. Each subcommittee will focus on 1 of 10 selected components of the EMSC continuum model. These components are the major clinical and administrative elements necessary for successful planning and management of EMSC subsystems at local and regional levels. The subcommittees include (1) systems management, (2) injury prevention, (3) prehospital care, (4) paramedic training, (5) emergency departments, (6) interfacility transport and critical care services, (7) pediatric trauma, (8) rehabilitation, (9) information management, and (10) emergency medical services for adolescents at risk for HIV infection.

The process of implementing EMSC products involves the following: First, specific product development by multidisciplinary project committees appointed by the California Emergency Medical Services Authority, from recommendations by the EMSC project staff; second, a four-stage process for consensus building and individual product peer review; third, modification of products after statewide review; and fourth, a systems approach to product implementation and programmatic development, using multiple strategies.

The California Pediatric Emergency and Critical Care Coalition, a preexisting consortium of California organizations and agencies involved in children's health care, has been restructured to provide broad-based consultation to the project and the subcommittees. The coalition's role will include a strong steering committee advisory relationship to the project staff, and activities to foster public and professional education about the objectives and products of the EMSC project.

EVALUATION: The effect of project activities on local EMS systems in California will be monitored in several ways, primarily through the extensiveness of product implementation. The California Emergency Medical Services Authority will survey all State EMS agencies to assess preproject levels of EMSC development, and will continue to monitor local product development during the project period.

EXPERIENCE TO DATE: The California EMSC project has appointed 13 active committees or task forces. The project has identified committee chairpersons, multidisciplinary memberships, objectives, methodologies, timelines, and meeting dates for each of these committees. In addition, staff have begun to publicize the project and disseminate information through conferences and press releases.

Emergency Medical Services for Children in Rural and Urban Settings

California State Department of Health Services/Harbor-UCLA Medical Center
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EMSC
MCH-064001
02/01/86–05/31/89
Project Director(s):
James S. Seidel, M.D., Ph.D.
Lynn Headley, M.D.

This project was designed to develop an emergency medical services for children (EMSC) program in California. All of the material and protocols developed have been implemented in California. Ongoing mechanisms have been developed. Material and newsletters have been shared at the national level.

The major goal of this project was the development of a project providing emergency medical services to children in participating counties in California.

The measurable objectives are included in the attachment labeled Final Report, October 27, 1989. This included the analysis and evaluation of data, continued systems development with participating counties, publication of a manual on *Developing EMS Systems for Children in Rural and Urban Areas*, collaboration with the District IX, American Academy of Pediatrics Critical Care Committee, and work with other states in the development of EMSC systems.

The methodologies implemented to accomplish the goals and objectives include the collection and analysis of data, development and implementation of program criteria, development of guidelines, holding coordination meetings, preparation of articles regarding EMSC, planning and development of EMSC projects and many other activities which are included in the project final report.

This project was evaluated on the basis of the completion of project goals and objectives which included development of EMSC in program sites, promotion on EMSC, and other stated activities.

The outcomes from EMSC as of the end of this project are addressed in the October 27, 1989 report. However, new EMSC sites were successfully established in California.

Several publications resulted from this EMSC project. They include: 1) *Prehospital Care of Pediatric Emergencies: Management Guidelines*, 2) manuals for the development of urban and rural EMSC, 3) a pediatric medical/trauma severity scoring system, 4) outline for an educational program, 5) guidelines for secondary transport of critically ill children, 6) a pediatric prehospital care equipment and supply list, and 7) preliminary data on outcomes of children and cost of prehospital care.

An ongoing newsletter was established to share information on California EMSC projects. As of project completion, there were 3,500 names on the mailing list. Information has been shared with other states and is available to interested parties.

Legislation was enacted in California (Senate Bill 1170) which appropriated $135,000 for the State Department of Health Services to contract for a study to determine outcome measures to be used to evaluate the implementation of a critical care system for critically ill and injured children in California. The Maternal and Child Health Branch issued a request for proposals and selected and funded the Research and Education Institute, Inc., Harbor-UCLA Medical Center. A report is due to the California Legislature and the Governor no later than January 1, 1991.

The entire federal grant of $941,724 was expanded on this Emergency Medical Services for Children in Rural and Urban Settings project. California does not currently have cost estimates for replication of these projects on a statewide basis. The study resulting from Senate Bill 1206 will hopefully be able to provide further information on overall costs of implementation.

Emergency Medical Services for Children—
Focus on the Neurologically Impaired Child

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EMSC
MCH-114001
10/01/87-09/30/91
Project Director(s):
Jane Ball, Dr.P.H.

PROBLEM: The enhancement of emergency medical services for children (EMSC) is expected to reduce the morbidity and mortality for children with acute illnesses and injuries. An estimated 1 million children experience a closed head injury annually. Traumatic brain injury (TBI) has a high mortality rate, and an estimated 16 percent of TBI children require hospitalization. Significant morbidity, particularly in cognitive functioning and behavior, has been reported in the literature. This demonstration project addressed the consequences of traumatic brain injury in children and focused on the rehabilitation component of emergency medical services for children.

GOALS AND OBJECTIVES: The goal of this project was to explore the consequences of pediatric traumatic brain injury and the needed rehabilitation services for children and their families.

METHODOLOGY: This project conducted a retrospective descriptive study of children with traumatic brain injuries. The sample of 93 study children was drawn from 465 eligible children in the Children's National Medical Center Trauma Registry. Criteria for selection of study children were as follows: (1) Age between 6 and 14 years, (2) injury at least 12 months prior to data collection, and (3) injury severe enough to require hospital admission. Data were collected from numerous sources, including parent interview, teacher survey, medical records, and physical examination of the child. Children were administered numerous standardized tests in neuropsychology, speech and language, behavior, and motor domains in one hospital visit.

EXPERIENCE TO DATE: During data analysis, efforts were made to identify the actual residual effects of traumatic brain injury in children with mild, moderate, and severe injuries. Impairments were identified in study children in each domain with standardized tests; however, the type of impairment varied by child characteristics such as age at time of injury and injury severity. It was determined that additional studies with matched controls and more extensive premorbidity data were needed to confirm the findings.

Postdischarge services required and received by study children and their families for reintegration into the community were reviewed. A pattern of postdischarge rehabilitation services needed by children with specific traumatic brain injuries emerged; however, further study is needed for validation.

Various resources for professionals providing care for children with traumatic brain injury were developed.

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MCHIP
MCJ-117025
10/01/90–07/31/93
Project Director(s):
Michael L. Millman, Ph.D.

PROBLEM: Many of the agents that cause childhood death and disability—such as motor vehicle crashes, unintentional injuries, immersion, burns, seizures, asthma, and epiglottitis—strike with great suddenness and require medical care on an emergency basis. In 1988, intentional and unintentional injuries were responsible for the deaths of more than 8,000 children ages 1–14, or approximately half of the deaths in that age group. Successful emergency treatment can help minimize both deaths and disability.

Historically, most emergency medical systems have been designed to deal with adults, not with children. Until recently, information on children's emergency care has been limited, and few studies have been done to evaluate those practices that are being followed. Efforts in the early 1980s by individual practitioners and professional societies helped focus attention on the need for specialized training programs and practice guidelines for pediatric emergency care. These efforts received a substantial boost in 1985 with the initiation of a Federal demonstration program for emergency medical services for children. The 20 projects that were funded between 1985 and 1990 have led to the development and dissemination of new training programs and approaches to organizing services. They also have generated data collection activities that should provide better resources for surveillance and evaluation of emergency care. Although the demonstration projects are valuable means of generating experience in improving pediatric emergency medical services, a broader and more comprehensive study being conducted by the Institute of Medicine will help fill the need for objective analysis of needs, potential benefits, and effectiveness of current program elements.

GOALS AND OBJECTIVES: The Institute of Medicine will assess the nature and extent of the problem of pediatric medical and trauma emergencies and their outcomes, describe the current state of services in providing effective care, address standards and data needs for surveillance and evaluation of services and outcomes, and recommend policy mechanisms to promote the development of better systems of care.

METHODOLOGY: This project is being carried out under the guidance of a 19-member committee of individuals with expertise in pediatrics, emergency medicine, trauma, nursing, prehospital emergency services, injury prevention, rehabilitation, hospital administration, public policy, and local government. Five members of the committee have participated in emergency medical services for children (EMSC) demonstration program activities.

Activities are undertaken as needed to support the committee's work, including site visits, workshops, and panel meetings. Five site visits will be conducted to study existing pediatric emergency services. It is anticipated that these visits will include a mix of urban and rural locations that have and have not participated in the emergency medical services for children demonstration grant program. Three panel meetings or workshops will examine specific topics in greater detail. Background papers may be commissioned for these meetings.

EVALUATION: Project progress will be monitored by the Institute of Medicine executive staff as well as by the study committee and staff. The status of each study is described and discussed at least monthly. After the study committee has completed the report, the report will be submitted for independent review under the procedures of the National Research Council (NRC). This normally involves a panel of six reviewers and a review coordinator who evaluate whether the study committee has fulfilled its charge in a responsible and well-documented manner. Studies that involve recommendations to the Federal Government are specially noted. The review coordinator must communicate approval of the report to the NRC monitor, who confirms that the review requirements have been met.

EXPERIENCE TO DATE: Funding for the Institute of Medicine Pediatric Emergency Medical Services study was awarded in October 1990, but administrative and staffing constraints delayed the start of work on this project until March 1991. A study director has been named, and the 19-member committee has been assembled.

On June 18–19, 1991, the committee held the first of five planned meetings and began to define the scope of the report it will produce. These initial discussions resulted in an agreement to focus first on two topics: (1) Establishing the essential components of a system of emergency care for children in a way that can better identify where the system is failing children, and (2) defining information and information systems that will facilitate assessments of the quality of care and cost-effectiveness of resource allocations. A second meeting was scheduled for September 25–26, 1991.

About half of the committee members were able to attend the National Emergency Medical Services for Children Conference: Report to the Nation on June 19–21, 1991. The report prepared for the conference and the presentations and discussions during the conference serve as valuable background materials for the committee's work.

Pediatric Emergency Medical Services Training Program
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EMSC
MCJ-113564
12/01/84–11/30/88
Project Director(s):
Martin R. Eichelberger, M.D.

PROBLEM: The 1990 Health Objectives for the Nation call for a reduction in mortality and morbidity caused by injuries. Injuries are the leading cause of death for children between 1 and 14 years of age. Major categories of injuries contributing to the mortality of children are motor vehicle passenger and pedestrian events, burns, falls, and drowning.

Responding to the special needs of children during an emergency is particularly challenging to prehospital emergency personnel. Not only do children have a smaller anatomy than adults, but their physiologic response to traumatic injury and acute illness also differs in many respects. Children will often receive different injuries than adults, even when involved in the same incident. In addition, they may not compensate as well as adults for the same injuries. For example, children may go into shock more quickly because they have a smaller blood volume. In some instances, children may compensate better than adults (as in the case of cold water drowning, because of the diving reflex).

Coupled with the physiologic responses of children to an illness or injury emergency are their emotional needs. A child usually responds to an emergency situation with fear. It is often difficult to communicate with the child because of his or her limited language skills. In addition, it is impossible to overlook the parents, who provide much of the child's medical history and represent security to the child in a critical event.

GOALS AND OBJECTIVES: The organization of emergency medical services (EMS), both prehospital and hospital, has been associated with a reduction in death and disability because of the opportunity to respond rapidly at the scene and stabilize an ill or injured patient. Training of emergency medical technicians (EMTs) and paramedics has focused predominantly on prehospital care for adults, because the majority of emergency calls involve adults. However, for those instances when the patient is a child, the EMT must be able to recognize potential life-threatening injuries and illness early and intervene appropriately.

METHODOLOGY: The U.S. Department of Transportation curriculum standards for the training of basic EMTs require 110 hours, with 3 hours devoted to childbirth and pediatric problems. Some States have chosen to add more total hours to basic EMT training, usually with some additional time given to pediatrics. Most newly trained EMTs are young, having little or no exposure to children and their expected behavior. Emergency specialists in pediatrics consider 3 hours to be inadequate training for EMTs to learn the appropriate response to childhood emergencies.

Children's Hospital National Medical Center began offering continuing education to EMTs and paramedics in 1982. Improved prehospital care for children has been observed. Rather than continuing to provide education only to local field providers, the pediatric emergency medical services training program (PEMSTP) was developed to address the pediatric deficiencies in the training of EMTs. Using a trainer of trainers model, EMT instructors, nominated by State EMS directors and selected by the project staff, are brought to Children's Hospital National Medical Center for 5 days of lectures, skills, and clinical experience in the special consideration and management of pediatric emergencies.

Upon completion of the program, these EMT instructor graduates are committed to return to their home State and teach pediatric prehospital care to field providers and/or other State EMT instructors. Each graduate receives an instructor's manual with lecture outlines, suggested audiovisuals, and supplemental course materials.

The graduates, in collaboration with their State EMS office, decide the best approach for dissemination of the pediatric emergency medical services training program material. Since the first class in January 1986, the instructor graduates have influenced their States to duplicate the program for their own instructors, to offer continuing education to EMTs, and to provide the content in recertification programs. Ultimately, as EMTs in the States and territories receive the training, it is anticipated that prehospital management of acute childhood illnesses and injuries will be improved.

EVALUATION: After 1 year of program development, the pediatric emergency medical services training program offered eight courses between January and November 1986. A total of 79 EMT instructors (representing 49 States, the District of Columbia, and 1 United States territory) have completed the program. More advanced course content has been added to keep the instructors challenged, without sacrificing the content believed most critical for EMTs. A followup survey and posttest have been sent to the first 40 participants to determine their retention of program information and their teaching activity over the past 6–9 months.

EXPERIENCE TO DATE: The EMS instructors who have attended the pediatric emergency medical services training program have been enthusiastic about the program, and have made significant efforts to provide pediatric prehospital training in their home States. A variety of EMT instructors (including training coordinators, full-time instructors, and part-time instructors, paid or voluntary) have attended the program; some are employed by their State, and others are paid by local fire departments.

At the present time, four States have committed to statewide pediatric EMS training. Most have elected to begin by training their EMT instructors, either duplicating the pediatric emergency medical services training program or modifying the course with a reduction in hours taught. In each of these States, clinical experience for EMT students in children's hospitals or other facilities has been arranged.

Other States are considering or are implementing instructor training based upon the pediatric emergency medical services training program, but not on a statewide level. Several EMT instructor graduates have already incorporated the content into the basic EMT courses they teach, even if the hours allotted to pediatrics have not increased. Other graduates are offering the course content in continuing education programs. The commitment by a State to offer pediatric training is related, in many cases, to the State's EMS organization structure, the level of EMS instructor attending the program, and the availability of State or private funding for such training.

Emergency Medical Services Grant for Children
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EMSC
MCH-124001
10/01/87–06/30/91
Project Director(s):
Joseph J. Tepas, M.D.

This project evaluated emergency medical services for children by coordinating the clinical, research, and educational efforts of the three major components of pediatric emergency care: Pediatric critical care medicine, pediatric emergency medicine, and pediatric trauma care. This evaluation focused on death and/or disability as the ultimate final consequences of critical illness or injury in children, and evaluated the effects of shock, respiratory failure, and coma. The pediatric population requiring emergency care was defined by combining existing component data bases into a single system to record epidemiologic, demographic, socioeconomic, and physiologic characteristics of children presenting for emergency care in northeast Florida. Outcome was evaluated by accumulation of physiologic data from the prehospital, inpatient, and postdischarge stages of care and attempts to validate the applicability of various physiologic scoring assessment systems to address each of these stages. The educational efforts of each component were combined and augmented to refine and improve dissemination of pediatric prehospital care courses for physicians, nurses, and allied health professionals. Progress through the course of this study was evaluated by a panel of experts (including a pediatric intensivist, pediatric emergency physician, pediatric trauma surgeon, critical care nurse, and paramedic educator) who reviewed data collected at 6 and 12 months.

The project thereby achieved three goals:

1. It supported development of a comprehensive combined data base with information on all aspects of pediatric emergency care;
2. It provided assessment of physiologic and anatomic indices of measurement during prehospital, hospital, and postdischarge phases of care; and
3. By periodic review of objective evaluators, it documented the impact of these efforts on improved emergency medical care for children.

Evaluation of Interventions in Childhood Brain Injuries
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EMSC
R18-MH47958
9/1/90–8/31/94
Project Director(s):
Martha A. Foster, Ph.D.
Robin Morris, Ph.D.

PROBLEM: Traumatic brain injury (TBI) is often accompanied by psychiatric sequelae such as chronic emotional and behavioral problems.

GOALS AND OBJECTIVES: The goal of this project is to develop, implement, and evaluate a child- and family-focused psychological intervention to prevent the occurrence of psychological problems in children with TBI.

METHODOLOGY: In this community-based treatment model, children ages 6–15 who have recently sustained a moderate-to-severe TBI and who are at significant risk for developing chronic emotional and behavioral problems attend a transitional classroom. The study involves two groups: A control group (no treatment) and an experimental group that receives child-focused classroom treatment and family-focused intervention as determined by family need. Children in the experimental group complete at least 16 weeks in the Transitional Classroom Program at Georgia State University. As part of this program, they receive group therapy and special assistance with academic and social functioning. Their families receive a range of treatment, including family therapy and other family-focused services as needed. Children are tracked for up to 2 years postinjury and their families receive assistance with finding the most appropriate school placement.

EVALUATION: The primary outcome measure is the psychological functioning of the children. Additional measures include family functioning and the neuropsychological functioning of the children.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. A program for in-classroom group therapy, entitled the Rainbow Circle Program, has been developed, and a procedural manual is being produced.
2. Training workshops have been conducted for educators and mental health professionals on intervention for children with TBI.
3. A referral and service system has been developed to fill the gap between acute care in the hospital and the return to community schooling. This system provides the interface between the medical and educational systems.

Emergency Medical Services for Children
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EMSC
MCH-154001
10/01/87–09/30/91
Project Director(s):
Donna Maiava
Calvin Sia, M.D.

The State of Hawaii Department of Health, in cooperation with all agencies concerned with the health care of children, developed a comprehensive plan to reduce the consequences of critical illness and injury in the pediatric population. A vertically integrated emergency system was described that coordinated care from the first respondent through field stabilization, transport, emergency care, rehabilitation, and case management by the primary care provider.

A quality assurance system was developed to monitor all aspects of emergency medical services for children (EMSC) in the State of Hawaii. The system included data collection, case review, problem identification, and mechanisms for change at all levels of emergency care. An EMSC Committee was established to review and monitor the information collected. Representation on this committee assured that solutions to problems would be implemented through appropriate agencies. Changes were made through improvement of services, education at all levels, and legislative action.

Specific grant activities included curriculum development and formal educational programs for training first respondents, prehospital personnel, nursing staff, and physicians in the critical skills necessary for managing pediatric emergencies. Standards for equipment, drugs, and skills were developed for facilities providing emergency pediatric services.

All project activities were particularly sensitive to addressing the needs of the unique aspects of the population of Hawaii. These included the transient tourist and military populations, the varied immigrant groups, and the native Hawaiian residents. The role of the professional community of Hawaii in providing services and consultation to the entire Pacific Basin received special consideration. Activities addressed the needs of a resort and tourist community, and these activities may serve as a model for States with similar resort and tourist communities.

The following products were planned with grant support:

1. A quality assurance system for a vertically integrated EMSC program including data collection, problem identification, and cyclic feedback to all levels of emergency care, resulting in education, improved services, and legislation;
2. A competency-based curriculum for training nurses in pediatric emergency care;
3. Skills, drugs, and equipment standards for office practice pediatricians, freestanding (nonhospital-based) emergency centers, and ambulance care;
4. Epidemiological studies of critical illness and injury in Hawaii;
5. Identification of special needs related to disabling conditions;
6. A rehabilitation plan for the State;
7. Education and training for all levels of pediatric emergency care;
8. A preschool injury prevention program; and
9. A curriculum to develop an emergency medical system for Micronesia during the second year of the project.

Idaho Emergency Medical Services for Children
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EMSC
MCH-164001
10/01/89–09/30/92
Project Director(s):
Paul Anderson

PROBLEM: Emergency medical services (EMS) across the United States face special challenges in providing effective emergency care to the pediatric population. Programs in rural areas report that low-volume patient contact makes it hard to maintain competency and that continuing education is unavailable or difficult to maintain. These problems are compounded for the pediatric age group, since less than 10 percent of total patient volume may be pediatric in nature.

GOALS AND OBJECTIVES: In an effort to remedy the potential deficiency in access to quality pediatric emergency care in rural areas, Idaho EMS applied for and was awarded an emergency medical services for children (EMSC) grant. The broad goals of the project are to reduce morbidity and mortality due to medical and traumatic emergencies in children treated by emergency care personnel. Upon completion of the grant, it is hoped that health care providers in Idaho will have a more complete understanding of the emergency care needs of infants and children. The following objectives were chosen for the project:

1. Implement, within 90 days of grant award, six regional EMSC committees to address systems development issues;
2. Conduct basic life support (BLS) EMSC training for 2,000 prehospital EMS personnel at essentially 100 percent of Idaho's EMS units during the 24-month project period;
3. Conduct advanced life support (ALS) EMSC training for 500 prehospital intermediate/advanced life support EMS personnel at essentially 100 percent of Idaho's intermediate/advanced EMS units during the 24-month project period;
4. Conduct EMSC training for 500 emergency nurses at essentially 100 percent of Idaho's hospitals during the 24-month project period;
5. Conduct EMSC training for physicians on the medical staffs of essentially 100 percent of Idaho's hospitals during the 24-month project period;
6. Implement an EMSC public education/prevention program in multiple pilot areas of Idaho during the 24-month project period;
7. Develop and implement a mobile pediatric interactive unit to deliver realistic simulation training to emergency care personnel with essentially 100 percent of the prehospital EMS units and hospitals in the State during the 24-month project period;
8. Correct, within 12 months, 100 percent of the rural hospital emergency department pediatric equipment deficiencies identified during the 1989 EMSC hospital survey;
9. Design and conduct an EMSC knowledge/skills retention study during the 24-month project period to determine the training frequency necessary to maintain critical knowledge and skills of emergency care personnel at acceptable levels;
10. Design and conduct a postincident family visit study during the 24-month project period to determine effectiveness of having emergency medical technicians (EMTs) and nurses perform such visits;
11. Reduce the anxiety and increase the comfort levels of prehospital and hospital emergency care personnel in Idaho in dealing with pediatric patients and their families; and
12. Implement EMSC training and public education/prevention programs for four Native American groups (Kootenai, Nez Perce, Owyhee, and Bannock-Shoshone tribes) in Idaho.

In addition, the following objectives related specifically to knowledge, transfer, and utilization have been outlined:

1. The Idaho project will demonstrate how a statewide EMSC project can be successfully planned and implemented in a State that does not have tertiary care centers and/or a university medical center;
2. The Idaho EMSC project will demonstrate effective use of the mobile training method to bring pediatric EMS training to prehospital and hospital providers in rural areas;
3. The use of the teleconference method of providing EMS educational sessions to EMS providers dispersed over a large geographical area will be shown to be a cost-effective approach that has considerable potential for use in other rural areas of the Nation;
4. The effective use of interactive laser videodisc methodology in simulating pediatric emergency situations for rural health care providers will be demonstrated; and
5. The results of the project studies will be widely disseminated to interested States that wish to implement similar programs.

METHODOLOGY: The Idaho EMSC project adapted the successful innovative programs of the California, Oregon, and Washington EMSC projects for the rural population in Idaho. An example of program adaptation is the reconstruction of the Washington State EMSC Pediatric Prehospital Care curriculum to work in a mobile training unit and teleconference presentation format.

In an effort to remedy the deficiency in accessing quality pediatric continuing education, a new approach has been developed using interactive videodisc technology.

Additional time and effort have been devoted to bringing quality pediatric education to Idaho for physicians and nurses throughout the State.

EVALUATION: Evaluation to assess the knowledge and abilities of emergency providers is accomplished via pretest and posttest methodologies. Data are collected by tracking system performance using the Optical Mark Reading system. In addition, select patient groups are being tracked from the emergency department through to discharge. We are also using questionnaires in select provider groups to analyze student perceptions of the effectiveness of the education program delivery.

The project is being tracked by timeline and contract completion guidelines. A computer-based program is being used to track all aspects, including dates, costs, and hours worked. This will provide forecasting, decision making, analysis, and evaluation.

EXPERIENCE TO DATE: We have completed our objectives concerning regional development and participation. Our educational objectives on a statewide basis have been completed for both prehospital providers and hospital staff. Educational programs have been targeted for Native American populations, and we have provided training in these areas. A statewide prevention program on bicycle safety has been implemented successfully. A hospital emergency department survey has been completed, and equipment has been provided to meet the needs of hospitals identified in the survey.

Implementation of the two research objectives required a longer time period, due to the difficulties and time spent finding qualified personnel to be involved in the studies. Progress has been achieved in both studies, and data collection and analysis have been scheduled for completion.

The Idaho EMSC project completed development and implementation of a mobile pediatric interactive videodisc training program. Our initial community visits generated a great deal of enthusiasm, and a second interactive videodisc program was planned. Knowledge, transfer, and utilization have involved use of the interactive videodisc concept. At this point, we have been very successful in providing information to adjacent States about implementation of EMSC programs.

Pediatric Medical Emergencies Interactive Videodisc Program

Idaho State Department of Health and Welfare
Idaho EMSC Project
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EMSC
MCJ-164002
10/01/91–09/30/94
Project Director(s):
Paul B. Anderson

PROBLEM: After completing formal emergency medical technician (EMT) training, emergency medical services (EMS) system personnel, especially those serving rural areas of the Nation, are still "unseasoned" for a considerable time until they obtain the necessary field experience. The period of time needed for EMTs to learn to make consistently good and fast judgment decisions in critical, life-threatening situations varies considerably, but usually takes months (sometimes several years), depending on their work volume. Pediatric cases are only a portion of the overall call volume, so EMTs need even more time to become competent and proficient in caring for children experiencing serious illness or injury. However, even after EMTs in rural areas acquire seasoned skills, their relative lack of exposure to critical patient situations can lead to deterioration of knowledge and skills over time. This problem also varies considerably among EMT personnel, due to differences in exposure to actual patient situations and in continuing education (didactic, practical, and clinical).

GOALS AND OBJECTIVES: The following goals and objectives were developed in relation to specific project activities. The overall goal is to reduce the mortality and morbidity experienced by children in life-threatening medical emergency situations by improving the training of the Nation's EMS personnel, with particular emphasis on those serving rural areas.

The project has identified the following objectives:

1. Design and produce an interactive multimedia courseware program on Pediatric Medical Emergencies for prehospital EMS personnel;
2. Make this program available for use in EMS units throughout the State of Idaho, using the mobile interactive training unit approach; and
3. Make this program available for use by other EMS programs in the country to educate prehospital EMS personnel.

METHODOLOGY: The Pediatric Medical Emergencies program will be developed using the following methodology:

1. Develop a request for proposals (RFP) package by the oversight management team of the Idaho Emergency Medical Services for Children (EMSC) project, containing specifications for the design and production of the program;
2. Distribute the RFP package to interactive multimedia design and production contractors around the country;
3. Award a contract to design and produce the Pediatric Medical Emergencies interactive multimedia courseware program;
4. Develop a team consisting of Idaho EMSC project staff, Idaho EMSC physician consultants, and other content experts to work with the contractor to design and develop the training program;
5. Develop a conceptual plan for the program, using the combined efforts of the staff, consultants, and the contractor;
6. Develop detailed scripts and storyboards for this program;

7. Conduct preproduction, production, and postproduction phases of the videodisc project;
8. Conduct the programming and related development work needed to complete the program; and
9. Conduct alpha and beta testing of the completed program and make any necessary revisions before distribution.

EVALUATION: The project will be evaluated as the design and development work proceeds. At every key phase, the Idaho EMSC team will review progress and problems and decide whether revisions in project plans are needed. The program will be evaluated thoroughly during the alpha and beta testing process. This will include testing evaluation by content experts (alpha testing) and then by prehospital EMS personnel (beta testing). Finally, the program will be evaluated by all the EMS entities that use it to train their prehospital response personnel. Program revisions and updates will occur based on this continuous evaluation process.

EXPERIENCE TO DATE: The project has been delayed while Federal audiovisual approval was obtained. However, many lessons learned in developing other interactive multimedia programs (the Respiratory Emergencies in Children interactive videodisc, and the work in progress on Pediatric Trauma) are being used to expedite design and production of this program now that audiovisual approval has been obtained. Lessons learned include considerable experience in delivering the Respiratory Emergencies in Children program to prehospital EMS personnel throughout Idaho, using the mobile interactive training unit approach.

Emergency Services for Children for Louisiana
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EMSC
MCH-224001
10/01/89–09/30/91
Project Director(s):
William D. Hardin, Jr., M.D.

PROBLEM: The quality of emergency medical services for children (EMSC) in Louisiana currently cannot ensure optimal and timely emergency care for all children with life-threatening illnesses or injuries in the State. Emergency medical services (EMS) personnel are inadequately trained in pediatric emergencies and lack the equipment necessary to initiate all but the most basic levels of pediatric life support. Emergency rooms are frequently ill equipped and poorly organized for the pediatric patient, while their respective institutions offer varying levels of subspecialty pediatric care. There is no regionalized system for pediatric care, and outcome is therefore a reflection of local EMS and hospital capabilities.

GOALS AND OBJECTIVES: The long-term goal of the Louisiana EMSC project was to reduce the morbidity and mortality due to pediatric emergencies by developing a statewide system for emergency pediatric care. This project incorporated features of previous EMSC grant recipients while offering new initiatives to expand upon previous efforts. Particular attention was focused on the emergency medical care needs of handicapped children and those who require chronic ventilatory assistance.

METHODOLOGY: Early initiatives in this project focused on areas that have traditionally been important to local/State EMSC development. These included establishing a replicable data base to guide future system development, initiating pediatric advanced life support training for EMS personnel, and assessing the current quality of EMSC care provided by EMS systems and hospitals in Louisiana. During the second project year, efforts continued in prehospital personnel education, data collection, and public education. Programs initiated in the first project year were strengthened and expanded. Intense effort was directed toward establishing long-term data acquisition and using the data to direct future legislative initiatives and systems change.

The Louisiana EMSC project was a cooperative venture sponsored by the Tulane University School of Medicine and the Children's Hospital of New Orleans. Tulane University School of Medicine coordinated the statewide project activities. Ongoing educational efforts were based at both Tulane and the Children's Hospital. To accomplish the long-term goals of the project, it was necessary to generate a community and statewide network among the myriad agencies and organizations concerned with the well-being of Louisiana's youth. After these contacts were in place, cooperative efforts were begun.

EXPERIENCE TO DATE: Project accomplishments included the following:

1. Education of paramedics/emergency medical technicians: One of the critical elements in improving emergency services for children in Louisiana was to upgrade the level of training and experience of prehospital personnel responsible for stabilizing and transporting the acutely ill or injured child. There were 12 advanced life support emergency medical services in the State, in addition to approximately 80 services which provided basic life support only. Efforts were concentrated on those advanced life support programs that covered the metropolitan regions of the State and provided services to the majority of the population. The premise behind these educational efforts was that field stabilization of the pediatric patient would improve outcome and provide greater options in triage of the pediatric patient.

   At the start of the project, the guidelines for prehospital personnel dictated a "scoop and run" philosophy in which pediatric patients were rapidly transported to the closest emergency room without field stabilization or resuscitation. Intravascular access was not established and the airway was managed through bag-valve-mask ventilation. Continuing education in pediatric care was minimal and prehospital personnel were uncomfortable dealing with the pediatric patient.

To address these problems, prehospital personnel throughout the State were given the opportunity to take the Pediatric Advanced Life Support (PALS) course which emphasized the importance of identifying shock and respiratory failure before the onset of cardiopulmonary failure or arrest. Based on the initial physical examination, treatment priorities were established and stabilization was begun. As of FY 1991, 16 PALS courses had been conducted around the State, and 143 paramedics/emergency medical technicians had completed the program. Prehospital personnel reported an increased comfort level in dealing with the pediatric patient. Attempts were made to quantify the benefits of this educational effort. The Louisiana EMSC project recognized that PALS training was a small step forward in improving the quality of pediatric emergency medical services. The PALS program was a simulation which had to be supplemented with practical, supervised pediatric experience. To accomplish this, prehospital personnel who had completed the PALS program were offered the opportunity to participate in a pediatric internship at Children's Hospital in New Orleans. The internship provided rotations through the operating room (where intubation experience was gained), the emergency room, and the pediatric intensive care unit. As of FY 1991, 23 students had completed the internship.

2. Pediatric emergency data collection: One of the premises of the Louisiana EMSC project was that long-lasting improvements in the quality of pediatric EMS would require the collection of data specific to Louisiana. While there were national data that adequately described the role of pediatric emergencies in morbidity and mortality in the pediatric population, the stimulus to change on a statewide level required data specific to the State. The project put together a computer system to permit long-term data collection beyond the period of project funding. The system allowed data to be collected from EMS services and hospitals. Data could be submitted through modem access. Data sets were determined and commitments were obtained from four major emergency medical services to submit data on their pediatric runs. Collection efforts took place. In addition to collection of data from emergency medical services, hospitals were asked to survey their pediatric experience. Because of the personnel required to collect these data, collection was planned as a short-term survey. This provided a limited perspective on the hospital care of the emergency-related injured child and helped identify hospitals with the experience and desire to provide EMS for children.

   The Louisiana EMSC project collaborated with the State Bureau of Emergency Medical Services to review education and training standards, equipment standards, staffing issues, and access to pediatric emergency medical services. The Governor of Louisiana appointed a Task Force on Emergency Medical Services, and the Louisiana EMSC project was represented on that task force. In addition, the project was involved with the Orleans Parish Medical Society, the Jefferson Parish Medical Society, and the Metropolitan Hospital Council to review triage protocols for pediatric patients.

3. Public education: The Bureau of Emergency Medical Services in Louisiana has been severely limited by personnel and funding shortages. The Bureau has been funded entirely by Federal dollars, and the scope of its activities was limited to certification and licensing of prehospital providers and inspection of ambulances. The fiscal problems in the State preclude passage of major legislation to either expand the scope of the Bureau's activities or provide increases in funding. To effect change in the structure of emergency medical services in Louisiana, the public must become informed about the importance of emergency medical services and demand change. The public must also become involved by taking responsibility for child safety and preventing pediatric accidents and injuries.

   To address these issues, the project conducted a pediatric emergency symposium, directed at health care providers and the public, which consisted of pediatric emergency education programs. The symposium was held in conjunction with the national Year of the Child in Emergency Medical Services campaign and generated significant media exposure for the issue. One of the most successful components of the program was the pediatric cardiopulmonary resuscitation (CPR) competition held for nurses and paramedics. Two-person teams competed first in a written examination and then in a practical demonstration of pediatric resuscitation skills. The competition generated enthusiasm among health care professionals and provided a mechanism for publicizing the issue through media coverage. Pediatric basic life support training was also made available to the public and was enthusiastically received. More than 150 individuals were certified in pediatric basic life support at the symposium. Future expansion of the pediatric CPR competition was planned to include teams from other States.

Emergency Medical Services for Children
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EMSC
MCH-234001
10/1/87-09/30/91
Project Director(s):
Charles Danielson, M.D.

PROBLEM: The Maine Emergency Medical Services for Children (EMSC) project sought to reduce the impact of critical illness and injury by improving the delivery of emergency medical services to children. The strategy of building on the existing structure of the Maine emergency medical services (EMS) system was used to facilitate implementation and assure continuation. The Maine State Board of Emergency Medical Services, the State agency overseeing prehospital care, has a strong working relationship with emergency providers, and their Physician Advisory Board members are all emergency physicians, but linkages of comparable strength had not been established with pediatric providers. Preliminary work had shown that Maine had more than 3,200 licensed providers with almost 75 percent at the basic or ambulance attendant level and less than 5 percent at the paramedic level. Review of standard training, equipment, and treatment protocols found deficiencies in the area of pediatric care.

GOALS AND OBJECTIVES: The goal of this project was to create a system that could reduce the impact of head injuries, posttraumatic shock, and respiratory arrests associated with infectious illnesses among pediatric patients.

METHODOLOGY: The concept that children should be cared for by appropriately skilled providers with appropriate equipment and in appropriate settings was a guide for project methodology. The project developed and implemented modular pediatric emergency training programs statewide for both prehospital and hospital providers. Basic pediatric equipment standards were developed for prehospital and emergency departments and emergency department capacity and interhospital transfer practices were evaluated. Injury prevention activities in playground safety and bicycle helmet use were implemented.

EVALUATION: The project used the existing Maine EMS Management and Information Systems (MIS) to carry out the evaluation and demonstrate how this data base could be utilized for evaluation. An outcome evaluation using hospital discharge data showed no significant changes in head injuries, respiratory arrests, and posttraumatic shock. The limited morbidity information available restricted the appropriate diagnoses to a small number.

EXPERIENCE TO DATE: Program accomplishments include the following components:

1. Results: The programs emphasized stabilization and evaluation of critically injured children. Prehospital trainees demonstrated considerable improvement in field performance after training, with each trainee receiving quarterly feedback on their performance assessment after training. The initial objective of training 75 percent of prehospital providers was unrealistic. Approximately 25 percent of pediatric EMS emergency runs included EMSC trainees at the conclusion of data collection, due to competing education, variable capacity to coordinate programs in the regions, and a perception of the lack of need. Strategies to overcome these barriers included statewide televised programs on pediatric EMS issues, intensive central office support for initial programs, and more aggressive promotion. Since turnover among emergency medical technicians (EMTs) is approximately 30 percent per year in Maine, a modification of the basic EMT curriculum was developed to include core pediatric information. Training programs adopted by Maine Emergency Medical Services should now result in greater coverage of pediatric issues in the basic and continuing training programs.

By the second year of hospital provider training, the program was in competition with the pediatric advanced life support (PALS) program. Since that program had a greater potential for long-term support and implementation through both the Maine American Hospital Association affiliate and the American Academy of Pediatrics, efforts were shifted to encourage that program, and more than 400 providers were trained in the PALS program.

Training was carried out for all squads serving Native American Reservations. In collaboration with the Maine Emergency Management Agency, two programs addressing the needs of persons with disabilities were televised statewide on the Maine EMS Interactive Television System.

2. Guidelines and standards: Basic pediatric equipment and prehospital treatment guidelines were developed for ambulances and emergency rooms. These were approved by the physician advisory committee.

3. Analyses: Special studies were provided to Maine EMS, including studies in prehospital pediatric head injury, interhospital transfer, and pediatric emergency department capacity. All studies found that serious pediatric emergencies are infrequent experiences for most providers, thus creating special challenges in a rural State. The prehospital head injury study found that, of all emergency transports for head injury in children in Maine in 1987, only 3 percent could be classified as severe. The heterogeneity of emergency services was underscored by the interhospital transfer and pediatric emergency department capacity studies.

4. Knowledge, transfer, and utilization: Project staff gave presentations at conferences in the region and nationally. Maine worked with Vermont and the New England Council for Emergency Medical Services to produce a conference on EMSC training in Hanover, New Hampshire, in March 1990. Papers are being prepared on prehospital head injury and performance impact of training.

5. Recommendations: An ongoing program to continue training and to modify treatment protocols and equipment guidelines is essential. Prehospital care is well organized in Maine and project activities have been adopted by Maine Emergency Medical Services. There is no leader for hospital activities, and discussions have been held with the Division of Maternal and Child Health about a program of pediatric quality assurance in Maine's hospitals. Professional organizations have been asked to include pediatric emergency education as an ongoing priority. Injury prevention programs will target local EMS for planning and carrying out interventions.

Maine Pediatric Quality Assurance Project
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EMSC
MCJ-234002
10/01/91-12/31/93
Project Director(s):
Patrick Cote

PROBLEM: This project addresses three issues affecting emergency medical services for children (EMSC) in Maine: The inability to monitor quality of care for pediatric emergencies, to determine appropriate modifications, and to provide interventions that improve patient outcome.

GOALS AND OBJECTIVES: The goal of this project is to develop an ongoing pediatric quality assurance system to assess clinical needs and to implement appropriate interventions in the process of care to improve patient outcome.

The project has three outcome objectives:

1. Integrate pediatric quality assurance activities into the State's existing emergency medical services (EMS) Quality Assurance Program;
2. Integrate the Pediatric Outreach Program into the Division of Maternal and Child Health programs, analyze clinical and outcome data, and provide continuing education to hospitals covering 80 percent of the pediatric admissions in Maine (outside of the Maine Medical Center); and
3. Improve the State's capability for an integrated analysis of pediatric care, from prevention through rehabilitation.

METHODOLOGY: The project builds upon the existing structure of Maine EMS and develops a strong linkage with the Maine Division of Maternal and Child Health. Maine EMS has a strong leadership role in prehospital services. Maine's Title V agency has extensive experience with hospitals and prevention programs. A child passenger safety educator, funded by the traffic safety agency, will join the project to provide education in areas with crash injuries and low seatbelt compliance. This project has two interrelated and complementary components: Maine EMS, which provides direct input about quality assurance studies to prehospital policymakers through its statewide quality assurance committee and regional quality assurance coordinators; and the Division of Maternal and Child Health component, which provides pediatric outreach from Maine's only tertiary pediatric center. The Pediatric Outreach Program models a very successful perinatal outreach program consisting of site visits, continuing education, case reviews, local option activities, and followup 3–6 months after the visit. Maine EMS has a quality assurance program that includes quality assurance coordinators in each of six regions, and a committee with statewide representation. The capacity to carry out pediatric quality assurance is increased with financial resources and support. The Maine EMS Data Research Unit provides information such as linked crash, EMS run report, hospital discharge, vital statistics, and census data to the EMS regions and the Pediatric Outreach Program. This leads to more comprehensive casefinding and also enables integrated quality assurance studies to extend from crash site through hospital outcome. Strong linkage between these two components of the project facilitate comprehensive integrated prehospital-hospital studies. Linkage has been established between the pediatric project director and Maine EMS and its statewide quality assurance committee, between the Maine EMS Data Research Unit and both components, and between the Pediatric Outreach Project and the regional quality assurance activities. The quality assurance consultant interacts with both components at multiple levels.

EVALUATION: The evaluation component will address three issues:

First, has pediatric quality assurance been integrated into the Maine EMS Quality Assurance Program? The project objectives are a direct measure. The success, procedures, and linkages are important foundations for continuation of pediatric quality assurance. The minutes and reports from the regions document the activities, and the followup reports estimate the impact of pediatric quality assurance on pediatric services.

Second, has the Pediatric Outreach Program been integrated into Division of Maternal and Child Health programs, and has the program responded to clinical and outcome data? If the program reaches 80 percent coverage, a broad constituency will have been served with the potential for ongoing support. The Pediatric Outreach Program report will document the impact, strengths, and weaknesses of the program. The ability of the program to analyze clinical and outcome data will be demonstrated by the interhospital transfer report.

And, third, does the system have the capacity for integrated analysis of prehospital and hospital data? The impact of the integrated studies is an important measure of this capacity.

Organization for Comprehensive Emergency Medical Services for Children in Maryland
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EMSC
MCH-244001
10/01/87-09/30/91
Project Director(s):
James Flynn, M.D.

This project expanded and constructed a system of emergency medical services for children (EMSC) with life-threatening illnesses and injuries in the State of Maryland. These efforts represented an extension of the statewide pediatric trauma system which had been operational for more than 15 years and integrated other regional pediatric critical care activities. In addition, attention was focused on the organization and improvement of existing emergency medical services for pediatric critical illness. This pediatric critical illness supplement was a natural evolution of our experience with pediatric trauma, neonatal transport, and pediatric burns, all of which were ongoing components of the Maryland Institute for Emergency Medical Services Systems (MIEMSS).

The demonstration included four projects. Project 1 studied the epidemiology and demographics of trauma and critical illnesses in Maryland children to quantify incidence, regional distribution, and existing outcome as measured by mortality, hospital stay, discharge disposition, and short-term followup. These data were used for planning for the specific emergency pediatric needs of the State's five designated regions and for targeting future interventions to improve outcome, with special attention to children with special health needs and minority children (including Native American children). Project 2 developed standards for patient triage within our pediatric echelons of care, examined current systems for identifying severity of illness and injury, and evaluated the applicability of these systems to acute illnesses and injuries in children. Project 3 refined and placed in modular format our current advanced pediatric life support (APLS) educational materials, with the goal of targeting educational interventions. These course materials were adapted for primary physicians, nurses, and paramedics within the EMSC system. These three projects were developed simultaneously with project 4, which facilitated application of this new knowledge within our current system.

In summary, projects 1, 2, and 3 focused on the development of new knowledge and data on EMSC, and project 4 addressed the parallel implementation of this knowledge and information to supplement our current system, including the organization of regional pediatric councils to facilitate designation and triage.

Michigan Model for Improving Pediatric Emergency Medical Services
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EMSC
MCJ-264001
10/01/91–09/30/94
Project Director(s):
John Hubinger
Contact Person:
Pat Hebert

PROBLEM: This project addresses the number and impact of childhood injuries in the State of Michigan. Target populations include emergency care physicians, emergency medical technicians (EMTs), school children, and parents.

GOALS AND OBJECTIVES: The overall goal of this project is to reduce the number and impact of childhood injuries in the State. The project has identified two broad objectives (one in training, the other in injury prevention):

1. Continue training of emergency personnel in Michigan to enhance their skill in dealing with pediatric emergencies and their awareness of the provider's role in preventing childhood injuries; and
2. Continue work on prevention of childhood injuries, focusing especially on fire and violence among schoolchildren (birth through elementary school) and their parents.

METHODOLOGY: The project will implement a total of eight activities—three to accomplish the training objective, and five to accomplish the injury prevention objective.

Training activities follow:

1. The Michigan Chapter of the American College of Emergency Physicians will retain a national speaker on pediatric emergencies to address their annual convention, the 21st Michigan Emergency Medicine Assembly (July 12–15, 1994). This activity will augment the work of the previous year, when physicians and paramedics were trained in Advanced Pediatric Life Support.
2. Continued support will be offered to a successful annual program in Michigan's Upper Peninsula. The Upper Peninsula Emergency Medical Services (EMS) Regional Conference, sponsored by the Upper Peninsula EMS Corporation, reaches emergency medical services providers who are unable to attend the annual conference in the lower peninsula.
3. Continued support for Michigan's new pediatric curriculum will be offered to the State's Instructor-Coordinator Society. A pool of pediatric items for the EMT licensure exams will be developed. Copies of the curriculum will be distributed, and supporting audiovisual materials (including childhood injury prevention materials) will be acquired.

Injury prevention activities follow:

1. A project entitled Kids Say No to Guns, developed through Children's Hospital of Michigan (Detroit), will be expanded and will include EMT involvement in year 3. A collaborative school program with EMTs, firefighters, and police will be developed to send the violence prevention message to children, parents, and staff of Neinas Elementary School.
2. Children's Hospital of Michigan will expand its year 2 activities in scald prevention by developing public education tools for use in emergency department waiting areas. The project will also expand topically, to include selected injuries among the top five injuries that cause death to Michigan's young children (through 14 years of age).

3. In year 3, the Benton Harbor and Benton Township Fire Departments will expand their collaboration with local hospitals to include information packets on the top five childhood injuries. These packets will be filled with information that is easily read and well illustrated to help parents protect their children from injury.
4. Distribution of smoke detectors and batteries in a low-income area will be refined and expanded during FY 1993–94. A public education effort (linked with the battery project) directed at latchkey children will be improved. Distribution will again occur through the Benton Harbor and Benton Township Fire Departments.
5. The Michigan Association of School Nurses spearheaded a project during year 2. During year 3, broad review and consideration of a school injury form will be needed, and a 1-day seminar is planned on the form and implications of its use. Following review and subsequent revision, the form will be pilot tested.

The Michigan Department of Education is now involved in planning a standard school injury report form, with expanded involvement expected during FY 1994. Other State agencies (Social Services, Mental Health, Office of Highway Safety Planning, and Education) and local health departments will also be involved in the Region V meeting on childhood injury prevention, planned for September 1993.

EVALUATION: All project activities will be conducted under subcontracts which include detailed workplans, timetables, responsible parties, and budgets. Measurable objectives to be accomplished and reported quarterly provide the primary tracking mechanism. Work on subcontracts begins immediately at the start of FY 1994.

EXPERIENCE TO DATE: Project accomplishments include the following: A seminar for 136 instructor-coordinators on pediatric emergencies (June 1992); publication of the pediatric emergency management curriculum (August 1992); final report of Phase I of the University of Michigan Data Project (December 1992); distribution of 10,000 injury prevention calendars to hospitals statewide (January 1993); technical assistance seminar for subcontractors (January 1993); training of three persons in juvenile firesetter behavior (February 1993); start of latchkey "survival" training in 13 elementary schools (May 1993); funding of five speakers on pediatric emergencies for annual EMS Expo (April 1993); distribution of 250 smoke detectors and 1,500 batteries (May 1993); and Kids Say No to Guns program at Children's Hospital (May 1993).

Certain delays in implementation have occurred due to staffing changes in the Emergency Division (Michigan Department of Public Health) and loss of a portion of the data. Overall, progress has been steady and satisfactory.

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EMSC
MCJ-294001
10/01/91–09/30/94
Project Director(s):
Kenneth E. Cole, Jr.

PROBLEM: This project addresses a target population of children under 14 years old with unmet needs, especially those living in metropolitan and rural areas of Missouri. The project is designed for statewide impact.

GOALS AND OBJECTIVES: The overall goal of this project is to reduce the State's childhood mortality and morbidity resulting from severe illness or trauma. This goal will be accomplished by enhancing the capabilities of Missouri's emergency medical services (EMS) system to respond to the needs of children.

The project has identified the following objectives:

1. Designate an administrative structure to ensure efficient and effective coordination of resources, data management, programmatic continuity, and long-term impact on the EMS system. The project will appoint a full-time coordinator (funded partially through this grant and partially through the lead agency). In addition, the Pediatric Subcommittee, which represents the major emergency medical resources in the State, will serve as the oversight and advisory committee.
2. Increase the capacity of first medical responders to apply the most current emergency care procedures to the care of children. This objective aims to reduce the financial barriers to Pediatric Advanced Life Support (PALS) training courses by supporting tuition scholarships for the education/training specialists and medical directors of ambulance companies throughout the State. The project will establish an ongoing PALS program for training the emergency medical technicians-paramedics of St. Louis City and Kansas City Emergency Medical Services.
3. Increase the capacity of second medical contacts to respond to the emergency care needs of children. This objective aims to implement a pilot program using existing self-learning modules for nurses in rural Missouri.
4. Establish an outreach effort in St. Louis and Kansas City to "adopt" bistate regions in order to encourage development of emergency medical services for children (EMSC) systems and initiatives.
5. Coordinate and extend the pediatric capacity of Missouri's existing prevention resources. This objective will focus on a population of children with unmet needs in the State and implementation of projects to evaluate the primary care resources available, and on the portion of the pediatric population that uses emergency services inappropriately. A marker to evaluate effectiveness of prevention/primary initiatives will be developed.
6. Expand a computer data base directory of rehabilitation resources for children ages birth to 16 years. Expanding the existing data base to include services for children up to age 16 will be a unique resource, completing the spectrum of services in Missouri from prevention to rehabilitation. In addition, a workshop is planned to address enhancement of rehabilitation services for children in the State.

METHODOLOGY: The State has a well-established emergency medical services system in place. This project seeks to enhance the EMSC system for the benefit of all children. This proposal was developed in a joint effort between the Bureau of Emergency Medical Services and the Pediatric Subcommittee of the State Advisory Council on Emergency Medical Services. Project objectives are based on a statewide survey of emergency medical personnel; an analysis of existing mortality, morbidity, and prevention data; and the assistance of an EMSC consultant.

As the grantee, the Missouri Department of Health is responsible for overall coordination of grant activities; the coordinator of each project component is responsible for coordinating activities related to specific components and reporting to the Pediatric Subcommittee of the State Advisory Council on Emergency Medical Services.

EVALUATION: Project evaluation will be coordinated jointly through the Pediatric Subcommittee and the EMSC project coordinator. Specific methodologies appropriate to each objective will be employed.

EXPERIENCE TO DATE: The coordinator of the project's Pediatric Advanced Life Support component reports that 67 paramedics have completed the PALS courses and a core of 15 St. Louis City paramedics have completed the PALS instructor program.

The coordinator of the Nursing Modules component has compiled interest surveys and identified program participants. Three workshops will be held in various locations in July, August, and September to orient 60 nurses to the self-learning modules; distribution of the modules will proceed immediately after the workshops. The coordinator of the *Rehabilitation Directory* component has evaluated and amended the survey instrument used by the resource directory. The coordinator for the regionalization, prevention, primary care, and immunization components has conducted outreach programs in Illinois to educate referring hospitals about the EMSC initiative and to encourage participation in the Federal EMSC program. Protocols for the primary care component and the immunization component have been submitted to the Department of Health's Institutional Review Board and have been approved. Letters announcing these projects have been sent to target hospitals.

The Pediatric Subcommittee of the State Advisory Council has submitted its recommendations on changes in hospital licensing regulations requiring hospitals to have transfer agreements for injured pediatric patients. Model transfer agreements have been developed and submitted to the Regional Trauma Committees.

Nevada EMSC Implementation Project
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EMSC
MCJ-324001
10/01/91–09/30/94
Project Director(s):
Sharon Ezell

PROBLEM: There is a need in the State of Nevada to expand and link efforts to improve emergency medical care for children. The Nevada Emergency Medical Services for Children (EMSC) Project addresses the specific training needs for emergency medical personnel to improve overall delivery of pediatric care, surveillance of pediatric emergency data, and public education about prevention, in an effort to ultimately reduce morbidity and mortality among Nevada's children ages birth to 21 years.

GOALS AND OBJECTIVES: The project has established goals in the following areas:

1. Education and training: The project works to integrate pediatric emergency medical services educational programs into the existing emergency medical services (EMS) system, using a previously developed EMSC curriculum modified for the specific needs of Nevada care providers. In the project's third year, at least 166 emergency medical technicians (EMTs) and 160 emergency department nurses will be trained through EMSC programs.
2. Pediatric surveillance system: Using a minimum prehospital data set developed by previous EMSC grantees, the project will link the existing prehospital data collection systems in Reno and Las Vegas with the State's hospital discharge data base. This will yield complete EMSC records on at least 90 percent of pediatric cases in these locations.
3. Public education in prevention: In its third year, the EMSC project will complete the posttesting of families who received childhood safety education calendars during the previous year. In addition, the Spanish translation of the Nevada seatbelt law will be distributed by EMS personnel at all preschools in the Hispanic community in Las Vegas.

METHODOLOGY: The project is implementing the following activities:

1. Education: Ten EMSC prehospital courses will be taught at 8 rural sites in the third year, and at least 166 EMTs will be trained. At least 160 emergency department nurses will participate in 4 EMSC pediatric emergency department courses. This will meet the original project target of training 500 EMTs and 200 emergency department nurses.
2. Pediatric surveillance system: The project will continue to collaborate with the Nevada Medical Data Project. Linkages between the prehospital records and hospital discharge records achieved for the Las Vegas area in the current year will be accomplished in the Reno area in the third year. The overall process will be further refined and checked for accuracy. Ultimately, complete EMSC records consisting of prehospital and hospital discharge information on at least 90 percent of pediatric cases will be available for review.
3. Public education in prevention: Childhood safety education calendars were distributed throughout the Native American population of Nevada during the current project year. In the third year, EMSC staff will administer posttests to families who received calendars to evaluate changes in their level of knowledge of childhood safety information. Also, EMSC staff in the Las Vegas area will collaborate with local EMS staff to distribute the Spanish translation of the Nevada seatbelt law to 100 percent of the preschools in the Hispanic community in Las Vegas.

4. Coordination: The project manager will continue to supervise the project on a statewide level and also serve as coordinator for project activities in the northern part of the State. The southern coordinator will continue to manage project activities in the southern part of the State. Close coordination will continue with EMS activities in Clark County (Las Vegas), Washoe County (Reno), and the State EMS Office.

EVALUATION: The number of emergency medical technicians and emergency department nurses trained in EMSC programs will be monitored by project staff. Once the prehospital data are linked with the hospital discharge data and reports are generated, records will be manually sampled for accuracy. Project staff will monitor the number of preschools that receive information on child restraint statutes; statistics will also be monitored on compliance with the child restraint law.

EXPERIENCE TO DATE: The original goals and objectives of the project have not been attained, due largely to a 9-month administrative delay in initiating project activities. Since operations have begun, the project has achieved most of its goals and objectives on schedule after correcting for the initial delay. Completion of project goals and objectives is anticipated by the conclusion of the third year.

In the first 2 years, 150 paramedics, 184 EMTs, and 40 emergency department nurses completed EMSC courses administered by the project. A prehospital curriculum and emergency department nurses' curriculum have been identified, and project workgroups continue to edit course materials to suit the needs of Nevada pediatric emergency care providers.

Initial automated linkage of prehospital and hospital discharge records has been accomplished for the Las Vegas area (Clark County). Due to changes in the State's mandatory reporting regulations, automated linkage is being developed separately for the Reno area (Washoe County). Due to backlogging and raw data inaccuracies, linkage in the rural areas of the State has been postponed. Efforts will focus on achieving linkages in the Reno area in the third year of the project.

Approximately 850 child safety education calendars were purchased from the Utah EMSC Project and were distributed through the Indian Health Service clinics by public health nurses. The Nevada EMSC Project will administer posttests to recipients in the third year of the project.

New Hampshire Emergency Medical Services for Children Project
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EMSC
MCJ-334001
10/01/91-09/30/94
Project Director(s):
Janet Houston

PROBLEM: Historically, the New Hampshire Emergency Medical Services (EMS) community has concentrated its efforts on adult trauma and medical emergencies and has devoted less attention to the specific needs of pediatric patients. This oversight is indicated by the lack of prehospital pediatric treatment protocols for basic emergency medical technicians or a pediatric triage mechanism, and the minimal amount of training dedicated to pediatric emergencies. Overall, EMS in New Hampshire has been oriented more toward intervention and less toward prevention. Emphasis on public information and education programs could be essential for the improved quality of care offered to New Hampshire's children.

GOALS AND OBJECTIVES: The mission of the New Hampshire Emergency Medical Services for Children (EMSC) project is to develop an integrated program to reduce the incidence of preventable pediatric emergencies and to improve the outcome of acutely ill and injured children. The project will continue to focus on four areas: Education programs for prehospital and hospital providers; public information and education efforts; EMSC system development; and quality assurance and data evaluation.

METHODOLOGY: In order to achieve its stated goals, the New Hampshire EMSC project plans the following activities:

Education programs:

1. Organize 12 pediatric prehospital care continuing education courses;
2. Continue to provide EMSC prehospital continuing education programs;
3. Organize one intraosseous infusion training program for paramedics;
4. Organize two pediatric emergency nursing courses;
5. Continue to use the Idaho EMSC interactive videodisc to train prehospital care providers in pediatric respiratory emergencies;
6. Organize two additional Advanced Pediatric Life Support (APLS) courses for physicians, nurses, and paramedics; and
7. Assist the New Hampshire chapter of the American Hospital Association in organizing Pediatric Advanced Life Support (PALS) courses.

Public information, education, and prevention program:

1. Finalize development and distribution of an EMSC media kit to the Bureau of Emergency Medical Services, the EMS community, and hospitals;
2. Distribute an injury prevention package to EMS services and personnel;
3. Complete a public information program based on social marketing principles; and
4. Continue to provide articles to EMS newsletters in the State.

EMSC system development:

1. Survey all acute care facilities about personnel, equipment, and current capabilities;
2. Develop a directory of rehabilitation resources for chronically ill, injured, and disabled children; and
3. Organize meetings of the pediatric committee to complete tasks related to standards of care.

Quality assurance and data/evaluation:

1. Conduct a pilot study on the EMSC minimum data set in the two hospitals currently using a trauma registry and E-codes;
2. Implement a regional demonstration study of community hospitals to collect the EMSC minimum data; and
3. Select sentinel pediatric injuries to track patients through the EMS system in order to evaluate treatment, triage, and transfer of the injured child from the prehospital phase through hospitalization and rehabilitation.

The project ensures coordination through cooperation with a variety of agencies, including the New Hampshire State Health Department and the Bureau of Emergency Medical Services. New Hampshire EMS meets regularly with the New Hampshire Medical Directors. The principal investigator of this project acts as chair for the pediatric task group of the New Hampshire Trauma System Development Program. The drowning prevention project in New Hampshire EMS Region IV is another coordinated effort, through which the New Hampshire Injury Prevention and Resource Center has assisted this project.

EVALUATION: The project has included evaluation in all aspects of its activities and objectives. The educational programs will include examinations before and after the course administration and student course evaluation questionnaires. Sentinel injury studies will determine treatment and triage patterns and track patients to rehabilitation facilities to determine whether the directory has had an impact on the rehabilitation portion of medical care.

EXPERIENCE TO DATE: Due to the late start of the project and because of personnel issues, anticipated progress has not matched the original grant schedule. However, a substantial list of products highlights the successes of the project to date. Following is a partial list of products by category: Pediatric Trauma Care course (curriculum, slides, and student packet); Planning to Avoid Childhood Emergencies (PACE) class (instructor guide, slides, and participant safety and resource guide); Advanced Pediatric Life Support course (publicity); public information and education (brochures, public service announcements, telephone stickers, newsletter articles); and surveys (equipment, hospitals, and community education).

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EMSC
MCJ-354001
10/01/90-06/30/94
Project Director(s):
Lenora M. Olson, M.A.

PROBLEM: The mortality, morbidity, and economic burden associated with childhood trauma and illness represent a serious public health problem in the United States. This is especially true in New Mexico, where our State's attention to the needs of children was ranked 49th out of 50 by the Children's Defense Fund. Improved emergency medical services for children (EMSC) can improve our children's health; however, several barriers must be overcome before emergency medical services (EMS) can reach all children in the State. These barriers include the rural nature of the State, which hinders rapid transport; widespread poverty; parents' and caregivers' lack of knowledge about emergency medical services systems; and a communication gap among the three major ethnic groups that must work together to make the EMS system function efficiently.

The New Mexico EMSC project has made significant progress in overcoming these barriers and in improving the health of children in our State.

GOALS AND OBJECTIVES: The long-term goals of this project are to reduce the frequency and severity of negative outcomes for children and families who have suffered an emergency, and to promote preventive activities to reduce injuries and critical illnesses that generate pediatric emergencies. Project activities will emphasize reducing interpersonal violence, motor vehicle injuries, and unintentional firearm injuries; and improving emergent care for chronically ill children.

METHODOLOGY: To reduce pediatric morbidity and mortality, we are using a multifaceted approach that includes:

1. Activating a childhood injury prevention component, which includes promoting peer educators on interpersonal violence in schools; highlighting firearm safety programs in both schools and communities; increasing the use of child restraint devices and seatbelts, especially among Native American populations; and encouraging injury prevention efforts among emergency medical technicians (EMTs);
2. Improving pediatric EMS clinical care: This component encompasses working with rural providers in community settings, cross-training of pediatric and emergency medicine residents, and enhancing pediatric EMT training;
3. Improving the data collection capabilities and analysis of childhood injuries through the New Mexico Trauma Registry and other available data bases; and
4. Supporting existing coalitions of child care advocates by involving key community leaders in the EMSC grant; adding additional groups as identified; and integrating the EMSC task forces, composed of statewide volunteers from health and social services fields, into a statewide coalition.

EVALUATION: Methods to track and evaluate our progress include:

1. Integrating EMSC priorities through an executive committee composed of EMSC coprincipal investigators, a project manager, a pediatric paramedic instructor, a financial advisor, and a program specialist;
2. Guiding EMSC priorities through a steering committee, composed of key community leaders, that meets quarterly to direct and advise the efforts of the executive committee and task force;

3. Developing, implementing, managing, and reviewing the efforts and projects of the EMSC task forces; and
4. Coordinating and periodically reviewing existing data bases to examine the effectiveness of intervention strategies relevant to pediatric health issues.

EXPERIENCE TO DATE: To achieve project objectives, we formed 10 working task forces, each directed toward improving particular aspects of emergency medicine, injury prevention, and health promotion for children in New Mexico. Task forces have enabled the EMSC project to empower communities to identify and implement effective strategies that will improve EMS for children throughout the State. People from diverse backgrounds have begun working together on the common goal of improving the health and safety of New Mexico's children.

Each task force addresses a specific focus:

1. The Interpersonal Violence Task Force introduced a pilot program on interpersonal violence prevention at a local middle school that involves students, families, school staff, and administrators. A pretest student survey assessed knowledge, attitudes, and behavior toward violence. A coordinator facilitates school activities that address dispute resolution, anger management, intergender violence, peer pressure, drug abuse, and suicide. A survey will be administered in September to assess if student attitudes toward interpersonal violence have been changed by the project.
2. The Student Task Force is working with school-based health clinics at an elementary, middle, and high school. Each clinic is conducting pretest and posttest surveys and is implementing self-esteem curriculums. End of the year activities will be coordinated to promote a peer educator exchange among the three schools.
3. The Firearm Safety Task Force is focusing efforts to elevate public awareness about the importance of firearm safety; specific efforts included airing televised firearm safety public service announcements in August and December, two months with statistically high injuries; distributing handbills on firearm safety in both English and Spanish to health clinics, hospitals, schools, and gun store owners; encouraging pediatricians to address firearm safety as an issue during well-child visits; participating in a televised morning talk show; staffing booths at health fairs and gun shows; presenting gun safety lectures at health conferences and schools; and working with schools to incorporate firearm safety as part of their health curriculum.
4. The Children's Motor Vehicle Safety Task Force developed a resource manual for local communities to initiate and implement child safety seat programs; technical assistance and car seat training is provided to these communities upon request. The task force also developed self-sustaining rent-to-own child restraint programs around the State for public health clinics, hospitals, and Indian Health Services. The programs include prenatal and postnatal information on the correct use of child restraint devices.
5. The Care of Chronically Ill Children Task Force is distributing an initial 500 Child's Updated Medical Summary (ChUMS) Cards. ChUMS is a pocket-sized set of cards that contains medical information about the child's conditions and is kept up to date by the caregiver. In a medical emergency, the caregiver presents ChUMS to the emergency care provider, putting the child's medical record at his or her fingertips. A survey will be conducted to evaluate the effectiveness of the program.
6. The Legal Task Force supported a third-year law student's research on existing statutory and case law pertaining to child abuse and neglect in New Mexico. The research is being used by the Child Abuse Task Force to promote an increased role for emergency physicians in identifying and reporting child abuse.
7. The Data and Research Task Force provides technical support to guide current research projects on pediatric pedestrian injuries, prehospital response to pediatric calls, and a retrospective medical chart review of pediatric trauma hospital care.
8. The Rural and Minority Outreach Task Force developed a format to bring health fairs to rural communities of our State. In conjunction with local resources, the task force recruits speakers and provides materials in response to the particular health concerns of the community. Efforts have concentrated on reaching Hispanic, Native American, and agrarian families; empowering local health resources to use injury prevention strategies; and highlighting appropriate use of the EMS system.

9. The Quality of Care Task Force conducted a retrospective chart review of all pediatric trauma patients admitted to our Level I Trauma Center in 1990. The data gathered indicate that most children who are admitted are not using car seats, seatbelts, or other protective devices that could reduce the incidence or severity of injuries. The chart review also revealed that horse-related injuries were one of the leading causes of hospital admissions for this group of trauma patients.

10. The Child Abuse Prevention Task Force is working to enhance the physicians' roles and responsibilities in identifying and reporting child sexual abuse. A flow chart form for identifying and reporting child sexual abuse was drafted and is currently being tested at selected clinics to determine its effectiveness; upon completion and success of the preliminary review, the task force will work with the New Mexico Human Services Department to incorporate the form into regulatory procedures.

We hired a bilingual health educator to work with the Gallup Indian Health Service on the Navajo reservation. The educator is familiar with the Navajo reservation and culture and has organized an infant car seat loaner program. The full-time commitment of a Navajo-speaking individual to a car seat program is seen as the fulfillment of a tremendous need, especially in the remote areas of the reservation.

Improved clinical care within our pediatric emergency system is a major EMSC goal. We have hired a pediatric emergency medicine specialist to initiate cross-training seminars for our emergency medicine and pediatric residents. In addition, a pediatric paramedic instructor is devoted full time to pediatric EMT training issues. We have also sponsored the attendance of two emergency nurses at the Florida EMSC Emergency Nursing Advanced Pediatric Management Seminar; in return, the two nurses trained 48 instructors and 235 providers statewide during 1991 and 1992 and will continue their efforts into 1993.

We have begun several research projects related to pediatric motor vehicle injuries and analyzed data from the medical investigator's office to develop a profile of childhood pedestrian deaths. We are compiling a data base of all critically ill and injured children who accessed the emergency medical system in Albuquerque for 1991. Data will be analyzed to obtain an EMSC profile of our State's largest city. We are also conducting a retrospective chart review of pediatric trauma patients that will be integrated into the ongoing quality improvement concurrent review.

The New Mexico EMSC project has made significant improvements in the pediatric components of our EMS system. We have enhanced the value and importance of injury prevention strategies in our State. We are confident that many programs we have begun will continue when our funding ends.

Development of a Regional Pediatric Data Surveillance System

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EMSC
MCJ-364002
10/01/91-03/31/94
Project Director(s):
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PROBLEM: This demonstration project targets the improvement and expansion of a data surveillance system (Pediatric Emergency Registry) which was begun in upstate New York with assistance from an initial emergency medical services for children (EMSC) grant awarded to New York State in 1986. Data on all seriously ill and injured children who enter emergency rooms in this combined urban/rural area of 1.2 million people are entered into the data base with the collaboration of all 21 acute care hospitals. For the most part, data are collected manually by local hospital staff; registry staff members obtain the data at the larger medical centers. The system is unique in that all hospitals in the region have been collaborating in this effort for the past 5 years.

Problems with the current data surveillance systems include the following:

1. Data collection is manual and inefficient—computer technology would improve accuracy and decrease the labor intensity of data collection;
2. Efficient and precise linkage between emergency room data and hospital discharge data is lacking, preventing tracking of patients;
3. Data that would enable identification of minority patients and their use of the emergency medical services (EMS) system are not being collected; and
4. Lack of both data linkage and data relating to minority groups has diminished the system's usefulness as an epidemiologic tool and as a means of assessing the quality of care provided by the EMS system.

GOALS AND OBJECTIVES: The project has established the following goals and objectives:

1. Improve the completeness, quality, efficiency, and usefulness of the data surveillance.

   Objectives:

   a. Assist hospitals is developing an easier and more efficient method of collecting and sending data to the registry;
   b. Develop a computerized linkage with hospital discharge data so that principal discharge diagnoses, length of stay, disposition, complications, and major procedures can be included in each hospital's data set; and
   c. Establish linkage with data sets of other States and the National EMSC Research Database currently under development.

2. Demonstrate the usefulness of a pediatric emergency data surveillance system by analyzing four sets of data.

   Objectives:

   a. Determine the use of the pediatric EMS system in rural and urban areas by children with severe illness or injury;
   b. Assess the current practice of interhospital transfer and the need for a formal pediatric transport system;
   c. Establish the epidemiology of serious illness or injury among minority groups (black, Hispanic) and low-income populations, with specific attention to variation in rural/urban areas; and
   d. Establish the relationship between emergency room diagnoses and final hospital discharge diagnoses as a measure of the accuracy of emergency room assessment.

METHODOLOGY: The project is carrying out the following activities:

Improving data surveillance: Project staff will provide assistance to all hospitals in developing mechanisms for relating existing computerized data bases (hospital discharge data, emergency department registration data, billing data) so that a minimal data set for pediatric patients with serious illness or injury can be extracted and placed in files compatible with dBase IV. We will supply all hospitals with dBase-compatible software for use with the files so that any data in logbooks but not in the data bases may be added. The hospitals will receive continued support for the efficient and timely transfer of data (by floppy disk or modem) to the main registry data base. Data linkages will be established with similar data bases in other States using the minimal data set/methodology currently under development by the EMSC Data Collection Task Force.

Demonstrating the data surveillance system: Data analysis for the four studies outlined above will be performed by the principal investigator and coinvestigators. The results of the studies will be made known to individual hospitals as appropriate for their internal quality assurance/improvement activities. In cases where problems are noted in the system of care, particularly with respect to minority groups, information will be shared with the appropriate health care system/EMS agencies and physician groups so that plans of action can be formulated.

EVALUATION: To ensure that the first project goal and objectives are met in a timely manner, the principal investigator, coinvestigator, or data clerk/analyst will make quarterly site visits to each hospital. Monthly telephone contacts with each hospital will be maintained to ensure continued data flow independent of the computer capabilities of the hospital.

The second project goal and objectives will be measured by issuing regular reports to individual hospitals, publishing articles in peer-reviewed journals, and developing formal communications with health system/EMS agencies at both local and State levels.

EXPERIENCE TO DATE: The major project activity has involved refining and expanding the Pediatric Emergency Registry data base, performing site visits to all hospitals in the region, generating individual hospital and regional data analysis reports, and developing the programming techniques necessary to accomplish the objectives of the first project.

1. Data base refinement and expansion: When the project started, emergency room data from 20 hospitals had not been entered since the end of 1989. During the first 3 months of the project, all 1990 data (representing approximately 4,000 patients) were entered; any missing data were retrieved by the information analyst via telephone or hospital site visits. Ongoing manual data collection efforts have continued while the programming techniques are being developed in collaboration with the hospitals. At this time, almost all 1991 data and several months of 1992 data have been received (requiring monthly or bimonthly contacts with the hospitals) and continue to be coded, edited, and entered. In addition, coding errors have been rectified and a code book has been initiated for more consistent coding.
2. Hospital site visits: After we sent an introductory letter to the chief executive officer of each hospital, we conducted a formal site visit at 19 of the 20 hospitals to review the purpose of this targeted project and to seek collaboration. The hospitals enthusiastically and universally endorsed the concept. During these visits, we were able to make assessments regarding the precise programming techniques and type of information that might be useful in each hospital.
3. Data reports: Individual hospital and regional reports of data collected during 1987–90 were generated and presented at the site visits. Trends were identified and reported, and the data have been used internally for quality assurance and improvement activities at several hospitals. Currently, a report is being generated on all interhospital transports in the region over the past 4 years to demonstrate to the regional medical center the need for a formal pediatric transport system.
4. Computerization/programming methods: A 486 Gateway 2000 computer was purchased and the registry data base (information on 19,000 patients) was transferred. Programs were written to generate the data reports. During the past 2 months, our analyst programmer has developed a plan to use the SPARCS hospital discharge data base, the Uniform Billing Database, and emergency department data bases to

streamline data collection. (Our programmer is developing an application program for use in each emergency room as a computerized log with additional fields to be used by each as desired.) Common data elements have been identified and site visits are now being made to implement merging of elements of these data sets via internal transfers of data. We are also contacting the New York State Department of Health to incorporate data from prehospital care records in the data base. Finally, we are collaborating actively with the Department of Surgery to establish a State-mandated Trauma Registry in the region; common data elements have been identified, and steps have been taken to link the two projects together for better efficiency.

Improvement of Emergency Medical Services for Children Demonstration Program
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EMSC
MCH-364001
02/01/86-01/31/89
Project Director(s):
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PROBLEM: A comprehensive program was designed to address all areas of emergency medical services for children (EMSC) in both urban and rural areas of New York State. Three target regions encompassing over 53 percent of the State's population (more than 9 million persons) were selected as demonstration sites for the development and testing of various program modules. These areas (Albany region, New York City, and Rochester region) were chosen for their location, population mix, distribution of urban and rural areas, expertise of program staff, and willingness to devote significant amounts of time to the program areas covered by the project.

GOALS AND OBJECTIVES: Project goals and objectives focus on the following program areas:

1. Categorization of hospitals: Standards will be developed for categorizing both urban and rural hospitals as receiving centers for the care of critically ill pediatric patients in all three regions. After the hospitals have been categorized, the designation process will be initiated.
2. EMSC training programs for emergency medical services (EMS) personnel: Training modules in pediatric emergency care for both basic and advanced emergency medical technicians (EMTs) such as paramedics will be developed in all three regions. These will be used to train at least one-third of the EMS personnel in the demonstration sites during the grant period. Evaluation of the outcome of certain traumatic and medical pediatric conditions will be performed before and after the training to determine its effectiveness.
3. EMSC ambulance equipment: The ambulance equipment needed for EMTs and advanced EMTs to manage critically ill pediatric patients will be determined in all three regions. Some of the needed equipment will be purchased using grant funds.
4. EMSC triage protocols: Management guidelines will be developed and implemented for children admitted to the emergency department presenting with cardiac arrest, respiratory emergencies, or multiple injuries in one region. Emergency department personnel will be trained in the management of such pediatric patients, and a pediatric emergency registry will be implemented. An evaluation of the efficacy of the guidelines and the training of the emergency department personnel will be performed.
5. EMSC treatment protocols: Pediatric treatment protocols will be developed and implemented in all three regions. The effectiveness of the pediatric treatment protocols in reducing pediatric morbidity and mortality will be determined.
6. EMSC training of emergency department personnel: A training program for managing pediatric emergencies admitted to the emergency department will be developed in all three regions. All emergency department personnel will be trained. The program's effectiveness in reducing morbidity and mortality will be determined.
7. Parent and caregiver training program: A parent/caregiver training program will be developed and presented to child care center workers and certain parent groups in two regions. The effectiveness of this program will be evaluated through telephone interviews and questionnaires.
8. Pediatric emergency hotline program: A pediatric emergency hotline for use by physicians, nurses, and other medical personnel, including a manual containing instructions on how to manage particular emergencies by telephone, will be developed in one region. An evaluation of the hotline system will be performed.

9. Pediatric transport system: A pediatric transport system will be developed (in one region) to transfer stabilized pediatric patients great distances (from outlying hospitals to a specialty pediatric care center) with the benefit of adequate monitoring and life support. The system will be evaluated by comparing its transport outcomes with those of alternative forms of pediatric transport.

All program activities will be under the supervision of the Medical Director of the Emergency Services Development Program of the New York State Department of Health, assisted by the State Emergency Medical Services and an advisory council consisting of EMS representatives from all regions of the State.

EVALUATION: The programs are designed to produce fully tested and easily implemented training modules or guidelines, and pediatric treatment and triage protocols to be used in any area of New York State, or in any State, with little or no revisions. The potential for replication of this demonstration project is therefore unlimited; the programs are very significant for the improvement of emergency medical services for children.

New York City Emergency Medical Services for Children Project
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EMSC
MCJ-364003
10/01/91-12/31/93
Project Director(s):
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Michael Tunik, M.D.
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PROBLEM: In New York City prior to 1986, there were no protocols in place for pediatric prehospital care, no pediatric standards for hospital emergency departments, and no endotracheal intubations performed on children. During our previous emergency medical services for children (EMSC) project, we were able to rectify these deficiencies. However, an evaluation of the advanced life support care delivered to children by the New York City emergency medical services (EMS) system is still lacking. Training of paramedics to intubate infants in the prehospital setting is still incomplete due to the loss of the animal operating room program of the American Society for the Prevention of Cruelty to Animals. A functional quality assurance model for emergency medical services for children does not yet exist. This project aims to address these deficiencies.

GOALS AND OBJECTIVES: The following goals and objectives relate to the three specific project activities.

Goal 1: Evaluation of the pediatric advanced life support component of New York City's EMS system.

Objectives:

1. Demonstrate the applicability of the Pediatric Ambulance Need Evaluation method as an objective measure of the use of ambulance resources; and
2. Determine whether advanced life support and basic life support ambulances are being used appropriately for the care of ill and injured children.

Goal 2: Develop a model quality improvement mechanism for pediatric advanced life support.

Objectives:

1. Evaluate the advanced life support care being delivered to children in New York City; and
2. Develop a quality improvement mechanism that will continue after the grant period ends and will serve as a model for other EMS systems.

Goal 3: Train New York City paramedics to intubate pediatric patients regardless of age.

Objectives:

1. Complete the training of New York City paramedics in infant intubation; and
2. Evaluate the paramedics' training in pediatric intubation and their subsequent field performance.

METHODOLOGY: The project will carry out the following activities:

1. Evaluating the pediatric advanced life support component: The Pediatric Ambulance Need Evaluation (PANE) score was developed to determine retrospectively whether a child required an advanced life support or basic life support ambulance or less acute mode of transportation. This score is objectively based on the child's emergency department diagnosis. PANE categories, developed by an expert panel reviewing emergency department diagnoses of children arriving by ambulance, categorized the level of prehospital intervention required. The applicability of this scoring system will be demonstrated by applying the score to data collected at another hospital.

   Ambulance call reports for all children who were likely to require advanced life support care (according to the assigned call type) will be reviewed to determine advanced life support interventions performed and to identify the receiving hospital. Emergency department diagnoses and outcomes will be obtained from

receiving hospitals and used for a systemwide evaluation of PANE. This will be compared to the type of ambulance dispatched, to determine the ability of the EMS telephone triage system to assign the appropriate ambulance to pediatric calls.

2. Developing a model quality improvement mechanism: An expert panel will review the ambulance call reports for children transported by advanced life support ambulance, to assess the frequency, type, and appropriateness of advanced life support interventions. Interjudge and intrajudge reliability will be evaluated.

3. Training New York City paramedics to intubate pediatric patients: With the New York City EMS system, we will train paramedic instructors to teach this module. These instructors will train the (previously untrained) paramedics in using this module. We will (1) assess psychomotor, cognitive, and attitudinal changes associated with the training; and (2) identify factors associated with successful intubation, and the willingness to attempt intubation in children.

   The project will collect information on all pediatric intubations performed in the New York City EMS system over an 18-month period. Intubations will be identified through a call-in system. Intubation data will be obtained through ambulance call review, receiving hospitals, and discussion with the paramedics involved. Data collected will include (1) child's age, diagnosis, and clinical status; (2) paramedics' method of intubation training, number of prior intubations performed (pediatric and adult), and length of experience as a paramedic; and (3) intubation procedure, including equipment used, number of attempts, complications, and outcome.

EVALUATION: Project activities will be tracked through regular meetings of project personnel to review the status of the objectives and to scrutinize the progress of related activities (training, and data collection, entry, and analysis) with respect to the targeted completion dates.

Project achievements will be measured by obtaining the following endpoints:

1. Demonstrate the applicability of the PANE evaluation in emergency medical services for children;
2. Assess the ability of the EMS telephone triage system to assign appropriate ambulances to children;
3. Define the current level of New York City's pediatric advanced life support procedure (frequency, type, and appropriateness);
4. Assess efficacy of intubation training for paramedics;
5. Define current frequency, success, complications, and associated factors for pediatric intubations by New York City paramedics;
6. Develop a new module for paramedic intubation training for children; and
7. Develop a model for quality review that can be adopted by other EMS systems.

EXPERIENCE TO DATE: Progress has been made in each of the project objectives, and the following activities have been accomplished to date:

1. Evaluating the pediatric advanced life support component: An expert panel has been assembled, comprising six physicians who represent the spectrum of pediatric emergency medicine, including pediatric critical care, pediatric surgery, and general academic pediatrics. Applicability of the PANE scoring system was demonstrated by applying the score to data collected at another hospital. Data were collected from Harlem Hospital Center, another city hospital in the borough of Manhattan, over a period of 1 year. Data from ambulance call reports and emergency department records were entered into our computer data base and combined with data already entered from Bellevue Hospital Center. To refine the PANE, the expert panel reviewed 222 diagnoses and came to a consensus on all but 13. Work continues, and we expect that a final PANE tool will be used systemwide in the second year of the grant.

   All pediatric call types associated with the PANE advanced life support categorization from the Harlem and Bellevue Hospital data sets have been identified. A preliminary data review is being performed on hard copy of computer-assisted dispatch data. This is a critical component in the strategic planning phase for a systemwide analysis of pediatric calls.

2. Developing a model quality improvement mechanism for pediatric advanced life support: An expert review panel has been established, including the two principal investigators of this grant, the project administrator, the new five-member New York City Quality Assurance team and their supervisor, and two physicians from Harlem Hospital. To assess interventions, the panel has developed quality improvement indicators based on current protocols. A system of collecting ambulance call reports has been devised for retrospective review so that the panel can develop criteria for quality prehospital care for children.

3. Training New York City paramedics to intubate pediatric patients: The project has developed a teaching package to train all New York City paramedics in pediatric endotracheal intubation. The package consists of a didactic presentation, skill sheets, skill station, scenarios, and a videotape (modified from other EMSC grant products). These have been developed with assistance from a professional educator. To date, 40 paramedic instructors have been trained in the use of these teaching materials. Another training session is scheduled to update 20 additional instructors. These paramedic instructors will, in turn, train the rest of New York City's paramedics in pediatric prehospital endotracheal intubation.

   Educational assessment tools have been developed with the help of a professional educator, and have been tested during the training program for instructors. These pretraining and posttraining tools include attitudinal questionnaires, cognitive examinations, and psychomotor skill testing. They are to be returned to the professional educator for validation. Once refinements have been made, they will be ready for use in year 2 of the grant.

North Carolina EMSC Project: A Model System for Statewide Plan Development

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EMSC
MCJ-374001
10/01/90-09/30/94
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PROBLEM: A number of deficiencies have been identified statewide in the provision of emergency medical services (EMS) to critically ill or injured children in both prehospital and emergency department settings. There is inadequate pediatric emergency care training and a lack of standardized procedures in the areas of patient care, triage protocols, and transport protocols. There is no statewide mechanism to track the causes of injury and illness in children and to measure the changes in health status in response to system changes. Many emergency departments and prehospital advanced life support vehicles also lack the necessary pediatric-specific equipment. Moreover, the time required to transport an injured child from the scene of the injury to a health care facility is much longer than desirable. Our project will address these EMS health system problems in the pediatric population in North Carolina.

GOALS AND OBJECTIVES: The following goals and objectives were developed for the three specific project activities:

Education and training:

1. Promote currently existing educational programs and target them toward pediatric emergency care;
2. Train additional instructors in Pediatric Advanced Life Support (PALS) and support the dissemination of the Advanced Pediatric Life Support (APLS) course;
3. Develop and disseminate separate educational curriculums in pediatric emergency care for prehospital and in-hospital acute care providers;
4. Assist with training and implementation of intraosseous (IO) infusions; and
5. Implement use of Broselow® resuscitation tapes and organizers.

Research and data base analysis:

1. Develop a mechanism to identify research questions, initiate research projects, and define data base analysis questions;
2. Create a project review mechanism to facilitate and monitor research;
3. Identify existing research resources, programmatic efforts, and characteristics of data bases in North Carolina;
4. Develop ways to integrate results into regional activities; and
5. Identify and pursue additional sources of funding.

Standards and equipment:

1. Develop model patient care protocols for the prehospital and emergency department provider;
2. Develop model triage protocols for prehospital use;
3. Develop model EMS and emergency department (ED) transfer protocols for pediatric patients;
4. Create a list of recommended equipment for the emergency care of pediatric patients in prehospital and ED settings; and
5. Implement and evaluate an intraosseous needle program for paramedics in the prehospital setting.

METHODOLOGY: Project staff will implement the following activities to achieve the stated goals:

Education and training:

1. Support educational conferences, such as the North Carolina Transport Institute and the Emergency and Critical Care Annual Conference;
2. Increase the availability of PALS and APLS courses;
3. Revise, adopt, and adapt existing educational materials to create our own training programs for prehospital and inhospital acute care providers; disseminate the educational programs/materials developed; and conduct lectures on pediatric emergency care topics; and
4. Develop an intraosseous infusion training program for EMS personnel.

Research and data base analysis:

1. Develop a strategy for identifying research questions pertinent to our project and stimulating research ideas;
2. Create a mechanism to fund targeted research projects;
3. Develop ways of identifying statewide research resources, programs, and EMS-related data bases;
4. Disseminate the results of activities carried out; and
5. Explore new and continued funding for project activities.

Standards and equipment:

1. Review model protocols developed by other emergency medical services for children (EMSC) projects as well as those from other sources, adapting and adopting those that are deemed suitable for our needs;
2. Review model triage protocols from other sources and develop criteria for triage protocols;
3. Review model patient-transfer protocols, develop and/or recommend protocols to manage the six most common clinical conditions identified, obtain endorsement from the appropriate health care organizations for these protocols, and publish and give wide exposure to these protocols;
4. Review equipment recommendations developed by other EMSC project States as well as from other sources; survey EMS providers and EDs to identify equipment deficiencies; and develop lists of recommended equipment for prehospital vehicles, EDs, and physicians' offices;
5. Review available educational programs for intraosseous use, and develop, implement, and evaluate an educational and implementation program; and
6. Provide Broselow® tapes and organizers to all advanced life support vehicles, critical care transport programs, and EDs in North Carolina.

EVALUATION: The techniques used to achieve stated goals and objectives will ensure timely and effective completion of all project activities. Specific tracking methods have been designed for each subgroup.

Education and training:

1. Survey EMS directors and emergency departments annually to assess the number of PALS providers in the various health care areas; increase the number of PALS providers in North Carolina by 30 percent in the next year; distribute the list of certified PALS instructors to all regional area health education centers, EMS regional offices, EMS training officers, and all acute care hospital nursing educators so that these groups can generate PALS provider courses; and increase the PALS American Heart Association affiliate faculty from 5 to 10 members. Additional affiliate faculty should increase the number of PALS instructors, thereby increasing the number of both PALS courses and providers. The number of PALS courses will be monitored by checking with the North Carolina American Heart Association.
2. Offer the APLS courses at least once a year in North Carolina and review the course evaluations.
3. Survey EDs and EMS providers for their use of protocols developed by the education and training committee; use the pretest and posttest format to evaluate the educational materials developed; and evaluate the use of the resource material developed and disseminated throughout the State.

4. Evaluate the intraosseous training program developed to determine the number of EMS provider programs that have instituted the intraosseous procedure.
5. Evaluate the use of the Broselow® system using the EMS and ED survey results.

Research and data base analysis:

1. Identify research goals and develop a mechanism to review and fund target research grants by December 1991;
2. Define questions and complete available data base analysis by December 1991;
3. Support the implementation of the Emergency Department Injury Surveillance (EDIS) System by funding the purchase of computer hardware for distribution into local hospitals by May 1992; and
4. Compile recommendations from research and educational activities so that they can be incorporated into the clinical care activities.

Standards and equipment:

1. Produce prehospital and ED protocols by September 1992, and gain acceptance and adoption of the recommended protocols by health care organizations statewide;
2. Produce and gain acceptance of triage protocols and patient transfer protocols by September 1992;
3. Develop lists of recommended equipment for emergency departments and prehospital advanced life support vehicles by April 1992; and
4. Implement a program for intraosseous needle use by paramedics in the prehospital setting by September 1991.

EXPERIENCE TO DATE: The major project activity has been the creation of three subcommittees—education and training, research and data base analysis, and standards and protocols—within the EMSC Task Force. Each group has made progress in achieving project objectives. The following activities have been accomplished to date:

1. Project 1—Education and training: Educational materials, including slides, videotapes, textbooks, and manuals, have been obtained from other EMSC project States and other sources. These were reviewed and used to develop a course curriculum for both prehospital and ED providers. Nine of the 18 chapters are now complete. The course will be completed in time for the first instructor-training course, scheduled for October 2–3, 1992. We have also purchased and selected videotapes and distributed these to emergency departments, area health education centers, EMS resource libraries, and associate colleges responsible for EMS training. We have trained over 90 additional PALS instructors, and one APLS course was held January 1992, with additional courses scheduled for June 11, 1992, and November 12, 1992. A conference, "Practical Approaches to Pediatric Emergency Care" is scheduled to be held August 21–23, 1992, in Myrtle Beach, South Carolina.
2. Project 2—We have collaborated with the Injury Prevention Research Center at the University of North Carolina-Chapel Hill by supporting the distribution of a microcomputer-based emergency department injury surveillance (EDISS) system into four hospitals to supplement the three that are already participating. Useable data should be available for analysis by August 1992. We reviewed 10 project proposals and selected 3 for project support. These research projects are well under way and are scheduled to be completed by September 1992. Several additional research projects have been completed, including a study of nonphysician-based transport of intubated pediatric patients, which will be published in *Critical Care Medicine* in July 1992. A statewide survey of emergency department capability in pediatric care was submitted for publication.
3. Project 3—We are completing our review of protocols for triage, prehospital, transport, and emergency care from various sources. Once this is completed, the standards and equipment subcommittee will develop our own model protocols. A recommended emergency department and prehospital equipment list has been developed. Six Broselow® resuscitation tapes and one organizer were mailed to all 117 acute care

hospitals in the State. Two additional organizers and 10 tapes have been ordered for each of the 45 paramedic and 15 advanced-intermediate EMS agencies in the State. We have also ordered the pediatric-specific equipment identified by the 18 regional EMS offices; each was provided $1,000 for equipment purchases. The intraosseous infusion training program was completed and made available October 1, 1991.

4. Knowledge transfer and utilization (KTU): We have planned a KTU meeting, inviting the EMS director and an American Academy of Pediatrics and American College of Emergency Physicians representative from nine southeastern States. This conference was scheduled to be held August 19–20, 1992, in Myrtle Beach, preceding our educational conference. We will exchange information about the projects we have developed.

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EMSC
MCJ-394001
10/01/90–09/30/94
Project Director(s):
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PROBLEM: Nationally, it has been determined that improvement is needed in prehospital and emergency department care for children. The premise of this project is that the underlying problem in rural areas is a combination of inadequate community organization, deficiencies in training of both prehospital and hospital emergency department personnel, lack of accurate and sufficient local data for assessing the needs of each community and region, and lack of successful planning for improvement and evaluation.

GOALS AND OBJECTIVES: The major goal of this project is to prevent childhood emergencies and to improve emergency medical services for children (EMSC). Project staff believe that EMSC is an intensely local matter and is best accomplished through development of effective local emergency medical services systems with linkage to referral centers. In order for the developed linkages to have any sustainable impact, it is imperative that the effort be supported by the local community organizations.

Other project goals include:

1. Detailed examination of the community structure in four rural/farm areas in relation to their history and perceived needs;
2. Development of local emergency medical service (EMS) advisory councils;
3. Development of networks within each region linking local EMS systems with local emergency department personnel and arrangements for local pediatric medical consultants;
4. Linkage of demonstration areas with regional children's hospitals and pediatric medical centers for consultation, education, referral, and case transfer;
5. Concentration on the special requirements of children with special health needs living in remote areas;
6. Development of training programs for prehospital and emergency department personnel, emphasizing preparation of local trainers to sustain the process after completion of the project; and
7. Development of public information and education programs stressing prevention, awareness of need, first aid, and effective access to emergency medical services.

METHODOLOGY: The project encompasses three phases:

1. Baseline data will be collected on the status of emergency care for children and the perceived needs for improvement, with the participation of relevant agencies, individuals, and the public. The following methods are being used:
   a. A leadership survey, based on interviews with personnel of local hospitals and emergency medical service agencies and other community leadership groups.
   b. Focus groups and nominal group processes with key community leaders and members of the general public, to obtain their views and attitudes about EMSC needs within the specific region.
   c. A detailed study of sentinel cases, reconstructing the sequence of events and the conditions surrounding the occurrence of the emergency, actions taken at the time, awareness of need for emergency services, communication with emergency medical systems, treatment at the site, transport to the hospital emergency department, and subsequent treatment, transfer, and outcome. We hope that these cases will provide the basis for the development of locally adapted standards for emergency medical care for children.

2. Interventions, to be agreed upon by consensus of community leadership, will include development of information, educational programs for the general public, education of prehospital and hospital emergency department personnel, and overall enhancement of the emergency medical service system.
3. Ongoing data collection will focus on determining the relationships between the processes implemented in the first and second year and their effects on the emergency medical system community.

EVALUATION: Throughout the entire project, detailed records have been maintained of every phase of the process, including planning, intervention, and data collection. A survey instrument will be developed for this project to assess the following: Initial status and the effects of the interventions; effectiveness of the training programs; changes in the quality of care; accuracy and compatibility of emergency medical services data and local advisory councils; and increase in linkages between local emergency medical services, emergency departments, and regional referral centers.

EXPERIENCE TO DATE: In addition to the EMSC education programs, data collection efforts, and community organizations that have been initiated in the four selected county clusters of Ohio, special projects have been developed in a lead county in each cluster.

1. In the Appalachian southeastern Ohio county cluster, a project has been developed to train emergency medical technicians (EMTs) as community educators in injury control, first aid, and proper use of the EMS system. A videotape is being developed to assist the EMTs in their pediatric outreach activities.
2. In the Appalachian southwestern Ohio county cluster, the Area Health Education Center has undertaken a community planning effort using the Planned Approach to Community Health (PATCH) developed by the Centers for Disease Control and Prevention. The community is developing a project involving an unintentional injury prevention program targeting transportation injuries.
3. In the northwestern Ohio county cluster, an area that includes many farms, a project has been undertaken emphasizing farm safety and strengthening the linkage between the EMS agencies, Ohio Agricultural Extension office, and hospitals in the region. The EMSC committee has developed a program entitled "Parent Alert—Safe Kids Are No Accident." This program includes a curriculum for parents on how to respond to pediatric emergencies and how to use the emergency medical system, along with tips on injury prevention.
4. In the northeast Ohio county cluster, a project has been undertaken with the Amish population, an agrarian cultural minority in Ohio. Holmes County has the largest Amish population of any county in the United States. This effort is built around the introduction of safety education into Amish schools, first aid instruction, and use of emergency medical services. In the Amish schools, lesson plans are being piloted on prevention, first aid, and proper use of emergency medical services for burning, choking, and broken bones. These lesson plans are an exceedingly effective method of engaging the interest of the children, as well as disseminating this information to their families.
5. The Bureau for Children with Medical Handicaps, in collaboration with local health departments, developed a program for children with special health needs, based on a component of the New Mexico EMSC Demonstration Project. This involves a passport-sized booklet that lists the special needs of the child. Information can be entered and updated regularly to be available in case of emergency. The public health nurses also instructed the families in injury prevention, proper use of the emergency medical services system, and special ways of dealing with emergencies involving children with special health needs.
6. A Tri-State EMSC Alliance has been developed with Ohio, West Virginia, and Kentucky to address regional EMSC needs and to establish resources for rural communities.

Developing and Improving the Capacity of Existing Pediatric Emergency Medical Services in Oklahoma

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EMSC
MCJ-404001
10/01/91–08/31/94
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John H. Stuemky, M.D.
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PROBLEM: Because of years of underfunding and lack of centralized planning, Oklahoma's health care delivery system has fallen behind the expected and even mandated standards recognized by the rest of the country. Data collection is of great importance in defining the emergency medical services (EMS) system of Oklahoma and developing a long-term plan for needed improvements in health care delivery. To date, there have been only sporadic attempts at data collection and analysis of emergency medical care provided to the children of Oklahoma. Without this data collection, future planning and development are subject to the same mistakes that have been made in the past. At this time, pediatric prehospital care training is limited to the content of the emergency medical technician (EMT) curriculum for paramedics and the EMT basic level, developed by the U.S. Department of Transportation, National Highway Traffic and Safety Administration. Hospital providers (both nurses and physicians) are equally deficient in pediatric training. There is no uniform method or policy for triage, treatment, or transfer of pediatric patients for hospital or prehospital providers. The prevention of child abuse injuries related to shaken baby syndrome has not been well addressed in this State, despite infant deaths.

GOALS AND OBJECTIVES: The project has established the following goals, with objectives specified by months of the project period:

Goal 1: Define Oklahoma's Emergency Medical System.

Objective: Produce and distribute a document that describes the status of emergency medical services for children (EMSC) at the prehospital and hospital level at the end of the grant period.

Goal 2: Develop or improve a method of pediatric EMS data collection.

Objectives:

a. Continue to collect prehospital EMS pediatric care data through month 36 and thereafter;

b. Introduce the Emergency Department Pediatric Injury Report, and provide support training for its use in 3 Indian Health Service hospitals and 10 other hospitals during months 24–27; and

c. Provide monthly reports to prehospital and hospital providers who participate in this data collection system by month 27 and thereafter.

Goal 3: Ensure continued EMSC activities, community planning, and coordination.

Objectives:

a. Proceed with the State funding initiative as part of the trauma care system to continue training and data collection activities for the 1994 legislative year;

b. Maintain involvement through presentations and participation with EMS and child advocacy groups throughout the State to promote EMSC goals; and

c. Cosponsor the 1994 SAFE KIDS 2000 Conference.

Goal 4: Improve EMSC services in prehospital care.

Objectives:

a. Conduct at least four Pediatric Advanced Life Support (PALS) courses to train 25 percent of the EMTs/paramedics during the year;

b. Provide a total of 10 pediatric curriculum workshops in regional sites for instructors of First Responders, EMTs (intermediate level), and EMTs/paramedics during the year; and

c. Complete and distribute prehospital pediatric protocols, in both hard copy and computer format, to 200 EMS providers.

Goal 5: Improve EMSC services in hospital care.

Objectives:

a. Provide pediatric emergency nursing instructor courses in Oklahoma on a regional basis to at least 50 nurses by month 30;

b. Provide onsite assistance, as needed, in presenting Oklahoma pediatric emergency nursing courses;

c. Complete protocols for pediatric emergency care for physicians and nurses and distribute these protocols to all pediatric liaison nurses by month 30;

d. Provide PALS courses to at least 100 nurses and physicians on a regional basis by month 33; and

e. Begin recognition of emergency departments approved for pediatrics (EDAPs) by month 28.

Goal 6: Develop and implement a program to assess and increase the knowledge of Native Americans about shaken baby syndrome.

Objectives:

a. Initiate research activities at two Indian Health Service hospitals to begin the shaken baby syndrome project during month 26;

b. Conduct the study at both sites with new mothers for a period of 6 months during months 26–32;

c. Finalize data and make recommendations from the study findings during last quarter of the project period; and

d. Produce and distribute a Spanish-language videotape about shaken baby syndrome presented from a Hispanic perspective (by month 30).

METHODOLOGY: The project will carry out the following project activities to achieve stated goals and objectives:

1. Define Oklahoma EMS and improve data collection: Collect data from prehospital and hospital sources encompassing the total care provided to pediatric patients in the EMS system (goals 1 and 2);
2. Ensure EMSC activities, planning, coordination: Attempt to secure State funding for EMSC and maintain a strong working relationship with community groups and professional organizations (goal 3);
3. Improve EMSC in prehospital care: Upgrade EMT training at all levels and provide training for instructors to disseminate training (goal 4);
4. Improve EMSC in hospital care: Provide training to hospital-based providers, nurses, and physicians through special nursing courses and PALS courses, and develop specific EDAP criteria for Oklahoma (goal 4); and
5. Shaken baby syndrome: Continue to distribute the videotape entitled "When Your Baby Cries," begin a study in conjunction with Indian Health Service hospitals, and produce a new videotape for Hispanic communities.

6. Coordination: This project continues to work closely with the Oklahoma State Department of Health, Emergency Medical Services Division; the U.S. Department of Health and Human Services, Indian Health Service; several tribal governments; Oklahoma University College of Nursing; Oklahoma State Department of Vocational Education; American Academy of Pediatrics; Oklahoma EMT Association; and Emergency Nurses Association.

EVALUATION: The evaluation of this project will be measured ultimately by the reduction of negative outcomes of pediatric emergencies. Tracking methods include meeting minutes and notes, course attendance records, data collected, and products generated. Each must correlate with the appropriate objectives for measurement of completion.

EXPERIENCE TO DATE: Our most successful activities have been related to EMT training, from course changes to instructor training. Nurse and physician training has been difficult due to issues related to obtaining PALS directorship and designating a nursing course. Data collection has been difficult due to the establishment of data sets and the training required to collect the data correctly.

Accomplishments include modification of the U.S. Department of Transportation's *EMT—A National Standard Curriculum* (December 1992); *Pediatric Minimum Ambulance Equipment List* (December 1992); and the videotape *When Your Baby Cries* (March 1993).

Emergency Medical Services for Children in Oregon

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EMSC
MCH-414001
02/01/86–05/31/89
Project Director(s):
Toni Bachulis, R.N., M.S.

PROBLEM: Although Oregon is progressing in regionalization of perinatal care and adult trauma care, the special needs of children in emergency medical situations have not been addressed. The existing research findings of major urban centers for standards and training must be tailored to our dispersed population.

GOALS AND OBJECTIVES: This goal of this project is to develop a regionalized, comprehensive emergency medical services (EMS) system for children in Oregon. The objectives of this project are to develop:

1. A methodology for developing and refining criteria for levels of pediatric critical care on a statewide basis;
2. Criteria for three levels of pediatric critical care facilities which have been demonstrated to be appropriate for respiratory failure and head injury;
3. A demonstration that statewide regionalization of pediatric care improves outcome for patients with respiratory failure and head injury in a rural area;
4. Materials for EMS field providers to use to educate adults in their communities about when and how to access the emergency medical services system for ill and injured children, and what to do until help arrives;
5. Prehospital and hospital algorithms for the treatment of head injuries which have been evaluated using objective data and which are appropriate when tertiary care must be delayed;
6. A paramedic pediatric curriculum and test which can be incorporated in the initial certification exam, and a basic pediatric curriculum which can be offered at low cost to rural emergency medical technicians by training trainers to conduct continuing education classes;
7. Videotapes for rural physicians on management of head injury to encourage proper treatment and transfer of pediatric head injuries in the field, when appropriate;
8. An evaluation of the effectiveness of transcutaneous PO_2 and PCO_2 monitoring in the field for pediatric head injuries;
9. A modular curriculum to train lay child care providers who give respite care for parents whose children have been discharged home but who have exceptional needs for specialized care; and
10. A rehabilitation evaluation protocol for pediatric patients who are discharged from acute care facilities.

These products are either not available or have not been tailored to the needs of rural States.

Texas Emergency Medical Services for Children
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EMSC
MCJ-484001
10/01/91-09/30/94
Project Director(s):
Rhonda Blackmore

PROBLEM: Prior to the advent of emergency medical services for children (EMSC) in Texas, there had been a lack of focus at the State level on providing pediatric emergency services. Despite the milestones already achieved, the increasing population and sheer size of the State pose unique challenges in implementing the EMSC program.

GOALS AND OBJECTIVES: The major goals and objectives of this program are to:

1. Increase the level of knowledge of pediatric emergency response among emergency medical services (EMS) providers and rural physicians and nurses;
2. Integrate a pediatric component into the planning and implementation of the statewide EMS/trauma system;
3. Build pediatric data collection and analysis components into the EMS/trauma registry; and
4. Develop public education materials on prevention of injury and illness, and on appropriate access to and use of the EMS/trauma system.

METHODOLOGY: Project activities include the following:

1. Training: This goal will be accomplished by providing pediatric emergency care classes and continuing education courses for EMS personnel, nurses, and physicians, targeting the rural areas. The project will also provide pediatric internships, continuing education through interactive software, and satellite outreach education.
2. Systems integration: A pediatric component will be integrated within the statewide EMS/trauma system through the use of model pediatric treatment, and criteria and guidelines for the triage, transport, and transfer of patients. This component will be implemented through the Trauma Systems Development Program. Introduction of hospital designation guidelines will be included to regionalize the system.
3. Pediatric registry: This goal will be accomplished by incorporating a pediatric data set into the existing EMS/trauma registry and analyzing an aggregate of data collected from major EMS providers throughout the State. Results will be used to target high-need areas in ongoing injury prevention activities.
4. Public education: The public information and education component has targeted an education campaign directed to emergency providers concerning childhood poisonings and other high-incidence injuries. An injury prevention component has been incorporated into the EMS Management Academy
5. Coordination: All training programs have been incorporated into the EMS Systems Development Mobile Training Unit. All system integration components have been coordinated with the Trauma Systems Development Program. All public education programs are coordinated with either the Public Information and Education Program or the Public Health Promotions Division of the Bureau of Emergency Management. The EMSC project works closely with TEMSAFE (a coalition of three basic-level EMS courses for training areas) through the University of Texas to assure adequate rural outreach. The EMSC program has assisted three emergency medical technician/paramedic programs, incorporating the EMSC program into the initial training of paramedics in Texas. Coalitions among hospitals, flight services, and local EMS fire departments have also been developed in three major metropolitan areas to ensure continued availability of the Prehospital Provider Pediatrics Course.

During the third year of the grant period, all pediatric activities will be fully integrated into the EMS Systems Development Program or the Trauma Systems Development Program (as appropriate) through the following: Continuing education materials for medical providers; a prehospital preceptorship; interactive training software; satellite broadcasting of pediatric care issues; and an injury prevention training curriculum.

EVALUATION: Student and instructor critique forms will be the major tool for evaluating the training goals. These forms will be used for all courses, the internship program, and the continuing education satellite transmissions and interactive software. Evaluation of systems integration will be self-documenting, through the appearance of the pediatric components in the Texas Trauma System Manual and in the regional EMS/trauma system plans. Data collection will be evaluated based on the effectiveness of integrating a pediatric data set in planning for the EMS/trauma registry and the effectiveness of the data in targeting intervention strategies. The public information and education campaigns will be evaluated by monitoring the volume of materials requested.

Data points established for the EMS/trauma registry will be tested for validity and will act as the ongoing monitor of the effect of treatment protocols and regionalization criteria as well as of the effect of injury prevention activities.

EXPERIENCE TO DATE: Thirty-six sessions of the Prehospital Provider Pediatric Course have been held; more than 700 individuals have participated in these sessions, coordinated by the EMSC program sessions. The pediatric preceptorship has been piloted in two children's hospitals. A manual has been developed that includes guidelines for the student and preceptor and problem-based learning scenarios. Educational software, based on the prehospital curriculum and learning-based scenarios, is also available. Six sessions of the Pediatric Advanced Life Support courses have been held. The first sessions of the Emergency Nurses Association's Emergency Nursing Pediatric Course are being promoted in Texas—in part by funding through contracts with the program. Five broadcasts have been completed through HealthNet via satellite.

Additional project accomplishments include the following: Hospital designation criteria have been developed; a study of feeder facilities has been completed to identify patterns of patient routing; a data set of more than 50,000 individual patient records from EMS providers is being analyzed for injury and illness patterns; a poison education kit is being developed and implemented; and a resource book of ongoing injury prevention activities among EMS providers will be completed. In addition, an internship has been developed for master's candidates in public health administration to allow these students to participate in and contribute to the ongoing activities of the EMSC program.

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EMSC
MCJ-494001
10/01/90-09/30/94
Project Director(s):
Jan M. Buttrey

PROBLEM: The purpose of this program is to enhance existing emergency medical services for children (EMSC) capabilities to reduce mortality and morbidity from injuries and critical illnesses in infants and children. This project is regional in scope, involving Utah, Idaho, Wyoming, Montana, Nevada, Oregon, Washington, Colorado, Arizona, and New Mexico. A major focus of this grant is the development of the Intermountain Regional EMSC Coordinating Council, with the hope that it will become a permanent regional EMSC organization.

There are four major problem areas within EMSC in Utah:

1. Precise definition of medical problems facing the emergency medical services (EMS) community is impossible because of a paucity of good data. This prevents accurate evaluation of the efficacy of any interventions to modify the EMS system.
2. Nineteen percent of Native American deaths occur in individuals under 24 years of age, compared to 6 percent of deaths occurring in the same age group in the remaining U.S. population. Delays in accessing EMS systems for serious infections and trauma may contribute to the discrepancy in age-specific mortality rates in Native American children. Factors that may contribute to these delays in receiving appropriate care are: (1) Lack of recognition and appropriate parental responses to serious childhood injuries and illnesses; (2) poor transportation and long distances from EMS sites; and (3) lack of adequate training in pediatric emergency care among local health care personnel who serve these children.
3. Tertiary pediatric facilities are limited in the intermountain region. As a result, the region is heavily dependent on critical care air transport systems to transport patients to appropriate facilities capable of providing definitive care.
4. Numerous EMS entities have developed courses and protocols for training prehospital personnel in the care of the pediatric patient. This results in conflict and confusion about the appropriate course or protocol to be followed.

GOALS AND OBJECTIVES: The overall goals of the Utah EMSC program are as follows:

1. Develop a comprehensive intermountain pediatric emergency medical services data base. A comprehensive EMSC data base has been established. The long-term goal is to establish this surveillance system as a permanent part of the EMSC operations within the region. The short-term goals are to (1) fully automate data collection in Utah, (2) analyze the incoming data to provide future project direction, and (3) implement an effective data collection mechanism for followup and outcome data.
2. Reduce the morbidity and mortality of Native American children in the region. The long-term objective is to reduce morbidity and mortality from injuries and acute severe illness by (1) developing new parent education strategies, (2) identifying and improving deficits in pediatric EMS equipment and skills, and (3) facilitating program development strategies by providing improved data collection and analysis.
3. Educate emergency care providers within the region about the capabilities, availability, and response times of existing intermountain regional air transport systems.
4. Establish consistent protocols and educational programs for EMSC throughout the intermountain region.

METHODOLOGY: Project activities include the following:

1. Data base development: The data base currently consists of an automated EMSC prehospital incident data file and emergency department log data. Data collection software has been distributed to all Utah facilities and to all States in the Intermountain Regional EMSC Coordinating Council. Wyoming will begin using this software in year 3, and other States are expected to use the system in the future.
2. Reducing morbidity and mortality rates: A health education calendar, *Two Worlds: A 1991 Calendar and Health Guide for Parents,* was designed to be a culturally acceptable health resource for parents to display in the home, providing quick reference and repeated exposure to basic health information. *Two Worlds: A 1992 Calendar and Health Guide for Parents* was modified to reflect information gained from the year 1 calendar. In year 3, we plan to (1) expand the target population to other high-risk groups, (2) conduct ongoing evaluations of the calendar's effectiveness, (3) modify the format to increase the educational impact as guided by the evaluation data, (4) streamline calendar production to decrease costs involved, and (5) secure ongoing funding for future calendar production.
3. Increasing availability and accessibility of hospitals: Survey instruments have been distributed to determine current resources (hardware, equipment, and personnel) available within the air transport systems in the region, and compilation of the resulting data is underway. Following compilation, these findings will be distributed to all emergency care providers in the region. Meetings involving representatives of each service will strive to achieve better integration and coordination of the pediatric air transport agencies in the region.
4. Improving consistency of protocols for EMS: Under the direction of Intermountain Regional EMSC Coordinating Council, a uniform base of prehospital protocols and educational programs can be planned across State and jurisdictional boundaries. This will permit the most economical delivery of those programs to the prehospital personnel. The Washington State EMSC curriculum has been used in Utah, Wyoming, Montana, and Nevada. We plan to develop six quality instructional packages of videotapes and workbooks, incorporating material from significant lectures of the Washington State EMSC course. This will allow providers to view the videotapes privately and use human instructors for the hands-on practical sessions. Pediatric curricular materials are also being distributed to emergency department nurses throughout the region.

EVALUATION: Project evaluation focuses on the following components:

1. Data base development: Data are currently being collected in Utah, and software is being installed in Wyoming. Project staff are providing assistance to agencies as this software is installed in the region.
2. Education of Native American parents: In year 1, the calendar was distributed to 200 Native American families. Monthly tests, containing questions for each month's topic, were administered to measure the effectiveness of the calendar's educational content. Test results showed a significant increase in parental knowledge in eight specific areas, and home visits revealed that 40 of 41 families (97.5 percent) were using the calendars 7 to 8 months after distribution.
3. Critical care transport systems: Following distribution of information on pediatric air transport capabilities in the region, response times will be evaluated, using the comprehensive EMSC data base, to determine subsequent reductions in delays to definitive therapy.
4. Development of consistent protocols: To evaluate the methodology, both pretests and posttests will be administered to participating prehospital personnel.

EXPERIENCE TO DATE: The project has accomplished the following activities:

1. Data base development: In Utah, the Bureau of Emergency Medical Services is empowered to establish an EMS data system. For 18 years, this system has consisted of a hard-copy incident report completed for each patient seen in the field by emergency medical technicians and/or paramedics, and an emergency department log. To date, 47 prehospital care provider agencies are submitting data electronically, and an additional 40 provider agencies have received copies of the software. Of Utah's 41 hospitals, 3 hospital emergency departments have submitted electronic data; 5 other hospitals are beginning data collection, and the remaining Utah hospitals are expected to come online in the future.

The data collection software has been completely rewritten to make it easier to use and to provide better local reporting. This software has been distributed throughout the region and is being used currently for data collection in Utah. Software "bugs" (or "features") are being noted and will be corrected in future releases.

2. Reduction of Native American morbidity and mortality: The 1991 calendar received the 1991 Healthy Traditions Award for Health Education Materials from the American Indian Health Care Association, and the 1992 calendar has been nominated for two such awards. The calendars were so well received that 6,300 of the 1992 calendars have been distributed to more than 125 individuals and/or agencies. New calendars will be available in year 3.

3. Critical care air transport systems: Data are currently available on 1,000 pediatric transports between 1988 and 1991. All Utah air agencies have agreed to provide data about pediatric transports. This data collection will be automated after other components of the data surveillance system are in place.

4. EMSC protocols: The project has conducted numerous educational activities, including (1) two EMSC instructor courses in Utah, two planned for Wyoming, one conducted in Montana, and two planned for Nevada; (2) modification of course materials where appropriate; (3) development of the instructional packages using these course materials; and (4) development, adoption, and initiation of the pediatric vascular access curriculum. More than 2,000 emergency care providers have participated in EMSC training conducted by EMSC staff. The Intermountain Regional EMSC Coordinating Council committee has coalesced into a cohesive, cooperative group representing seven States, and may grow to nine with the possible addition of New Mexico and Arizona. The main focus of these meetings is to share each State's new training interventions and avoid the cost of duplicating these efforts. We anticipate that this group will become a permanent regional EMSC structure.

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EMSC
MCH-504001
10/01/89–09/30/92
Project Director(s):
Patrick Malone

PROBLEM: Vermont is a rural State with a population of 550,000, including 139,000 children under 18 years of age. Emergency medical services (EMS) are provided by 140 licensed ambulance and first responder services, primarily small volunteer organizations. Fifteen hospitals operate emergency departments. Leading causes of death from 1980 to 1989 for children in Vermont parallel the experience of many other States: Motor vehicle injuries accounted for 36.2 percent of childhood deaths; other unintentional injuries, 19.6 percent; suicide, 9.3 percent; homicide, 3.4 percent; various diseases, 29.1 percent; and other causes, 2.3 percent.

GOALS AND OBJECTIVES: The goal of the Vermont Emergency Medical Services for Children (EMSC) Project is to increase the capacity of the EMS system to deliver pediatric emergency care.

Objectives for the project period include:

1. Complete the implementation of a pediatric emergency registry;
2. Continue implementation of a standardized run report system;
3. Continue delivery of prehospital training courses;
4. Continue expansion of pediatric advanced life support (PALS) training for physicians, nurses, and paramedics in the State;
5. Implement the pediatric emergency nursing curriculum for nurses throughout northern New England;
6. Produce an interactive videodisc on pediatric trauma with the Idaho EMSC program;
7. Complete statewide and neighboring State implementation of the Mediquiz and Pediatric Respiratory Emergencies interactive videodiscs;
8. Continue to support the involvement of prehospital providers in locally based injury prevention initiatives;
9. Complete the evaluation of previously implemented prevention programs; and
10. Support the Vermont Child Safety Coalition's ongoing efforts to plan for long-term EMSC goals and to develop strategies to meet identified needs.

METHODOLOGY: Minimum data sets have been established for the pediatric emergency registry. Scannable forms will be used in hospital emergency departments to gather information on pediatric patients. Output reports will be provided to each hospital, and aggregate information will be available to the State. A standardized statewide run report form is being updated, and a standard data set will be entered into a computer. Output reports will serve a variety of users.

Ongoing traditional education and training activities statewide will enable the project to meet target percentages of EMS providers. Squad inservice training and a 1-day basic life support prehospital course are the primary delivery mechanisms.

Two interactive videodiscs (Mediquiz and Pediatric Respiratory Emergencies) will continue to be circulated throughout Vermont hospitals, affording a highly standardized and cost-effective means of delivering state-of-the-art training to all levels of EMS providers. A third interactive videodisc on pediatric trauma will be jointly developed in conjunction with the Idaho EMSC project.

Nurses, physicians, and paramedics will continue to have improved access to PALS training through expanded offerings at multiple sites in the State. An initial offering of the new pediatric emergency nursing curriculum will take place for nursing instructors in Vermont, New Hampshire, and Maine.

Project staff will support local injury prevention initiatives with technical assistance and printed materials for EMS agencies. Evaluation of previously implemented community-based prevention programs will be completed. The project plans to contract with the Vermont Child Safety Coalition for delivery of EMSC training programs this year to help ensure the viability of this group beyond the project period. This broad-based group is beginning to identify long-term EMSC goals and strategies for change.

EVALUATION: Effectiveness of project activities will be measured by several different mechanisms. Establishing the pediatric emergency registry and the prehospital run report system during this project year will be process measures for the data surveillance objectives. Pretests and posttests are being administered to participants of EMSC courses in Vermont. We are tracking the percentage of physicians, nurses, and prehospital providers who have participated in EMSC training.

We are also tracking the number of injury prevention initiatives. Several community-based prevention initiatives supported in previous years of the project had specific outcome measures built into the program design.

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EMSC
MCH-534001
10/01/87-09/30/91
Project Director(s):
Dena Brownstein, M.D.

PROBLEM: The needs of the injured and critically ill child are not adequately met by the existing emergency medical services (EMS) system in Washington State. In a survey of EMS units in Washington, it was clear that little field intervention was undertaken for the youngest and most seriously ill children. The same survey found that an overwhelming majority of prehospital care providers surveyed felt a need for additional training in pediatrics. The statewide survey also revealed that only 24 percent of EMS providers could identify a pediatric consultant. Lack of a statewide system for data management and lack of linked outcome data impede efforts to identify and target problem areas. Minority populations are at risk for excess morbidity and mortality as a result of delayed or inappropriate pediatric EMS utilization. While the State maintains standards for receiving hospitals under EMS, there are no specific pediatric standards, and there is no system for triaging children according to severity of illness, degree of injury, and qualifications of the receiving hospital.

GOALS AND OBJECTIVES: The goals of the project were to: (1) Eliminate excess morbidity and mortality in pediatric emergencies resulting from inadequate knowledge, equipment, and support of prehospital care providers and hospital-based medical personnel; and (2) eliminate excess morbidity and mortality among minority children due to cultural, language, and economic barriers to emergency care. The objective of this project was to address the technical information needs of prehospital and emergency room providers, focusing on trauma, seizures, and drowning.

METHODOLOGY: Twenty-five percent of prehospital care providers in Washington State received training, and an ongoing system for training was established. A set of field guidelines and algorithms for pediatric basic and advanced life support was developed. A pediatric course for emergency room physicians was conducted. It focused on recognition of serious and life-threatening pediatric emergency conditions and their initial management and stabilization in the emergency room. The project developed a system to designate hospitals which meet objective standards of care as pediatric emergency and critical care centers. Additionally, uniform criteria for secondary transport were implemented throughout the State. The project established a pediatric data base. Pediatric data, collected on existing EMS forms, were linked with mortality data and hospital discharge summary data. The purpose of the data base was to: (1) Monitor pediatric EMS care in the State to identify regions, diseases, or other factors with poor outcome; (2) provide the basis for conducting research into pediatric EMS care in the State, and allow for more indepth epidemiologic studies; and (3) evaluate the success of the pediatric EMS interventions implemented under this grant. To assess the issue of underutilization of emergency medical services by minority groups, a survey was conducted on utilization of EMS by Native Americans, migrant workers, and Southeast Asian refugees in order to identify specific barriers. A report of the findings and recommendations was planned. To facilitate patient followup after discharge, a pilot project to establish a referral system between the hospital and local public health nurses was conducted. To facilitate adaptation, utilization, and implementation of components of the Washington State project, the States of Alaska, Montana, and Idaho (the WAMI region) were involved from the inception of the project. Detailed information on those components of the project of interest to each of the WAMI States were provided throughout the project period, and consultation was provided to the States upon request. Quarterly conference calls were conducted for mutual problem solving and sharing. The steering committee, with wide representation from the medical community, State and local EMS systems, and community agencies, provided oversight for the overall operation of the project.

Improving Emergency Services for Children in Wisconsin

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EMSC
MCH-554001
10/01/87-09/30/91
Project Director(s):
Gerri Britton

PROBLEM: Each year, unintentional injuries and emergency illnesses among Wisconsin's population of children under 18 years of age cause more than 500 deaths and thousands of hospitalizations. Injuries are the leading cause of death and disability among children. Appropriate and timely intervention through the stages of prevention, prehospital care, hospitalization, and rehabilitation have been shown to prevent deaths and reduce the severity of disability resulting from pediatric emergencies.

GOALS AND OBJECTIVES: In 1987, Wisconsin was awarded a 3-year Federal grant. The purpose of this initiative was to:

1. Expand and improve State and local capabilities for reducing pediatric emergencies and their consequences in the State;
2. Generate financial support from local and private sources for continuation of the programs after Federal support terminates; and
3. Foster in other States the capability to reduce pediatric emergencies and their consequences.

The overall goal of the project was to develop a plan for improving emergency medical services (EMS) for pediatric emergencies. The plan was designed to reduce pediatric death and disability from injury and sudden critical illness in Wisconsin by a minimum of 10 percent within a 5-year period and to increase both awareness and capabilities of providers, parents, and the public for emergency care of Wisconsin's children.

The following project objectives were established:

1. Hire project staff and continue the meetings of the Wisconsin Emergency Medical Services For Children Task Force;
2. Complete collection of baseline data and conduct a needs assessment (including identification of consequences, determinants, and contributing factors) of the Wisconsin EMS system as it pertains to pediatric patients;
3. Improve the availability of emergency medical services for children (EMSC), including Native American children, in rural areas of Wisconsin; and
4. Improve the appropriateness of emergency medical services for children in rural areas of Wisconsin.

METHODOLOGY: This award was preceded by the creation of the Wisconsin Emergency Medical Services for Children Task Force, which guided the grant application development and continued to guide every facet of the project. The creation of this task force assured that attention was focused on the needs of the pediatric patient, that activities were coordinated with all interested and necessary parties, and that activities would continue after the project ended.

The task force included the following committees: Assessment and Treatment Guidelines, Communications and Equipment, Data Development and Evaluation, Native American Programs, Public Information and Education, Special Needs, and Training Development. This task force and its seven working committees brought together agencies, associations, and individuals involved in pediatric and emergency care and treatment.

The 28-member body included all chairpersons of the working subcommittees. The organizational structure of the task force (and its support staff) consists of the following groups: Center for Health Systems Research and Analysis, the University of Wisconsin; Elert and Associates, Communications Specialists; Knopp and Watson Advertising Agency; WHA Radio/TV, University of Wisconsin; WISCOMP; Wisconsin Indian Network for Genetic Services (WINGS); and Wisconsin Farm Bureau Federation. (Consultants assisted and augmented the expertise of the task force and project staff.)

Project methodology focused on target populations through activities designed to:

1. Focus all project areas (data development, training, public information, and education) on the needs of three specific populations: Rural children, Native American children, and children with special needs;
2. Expand CHILD ALERT 10-33, a prehospital emergency program for children with special needs, to more than 100 ambulance services; and
3. Survey all Native American tribes, identifying the number and location of children on reservations, together with EMS activities and capabilities.

Project staff consisted of 4 full-time positions funded for 2 years of the project period and an intern position funded for 1 year. Positions were housed in the Emergency Medical Services Section, Bureau of Environmental Health, Wisconsin State Division of Health. These positions included project director/coordinator, nurse coordinator, public information and education coordinator, training coordinator, and program assistant.

The project also collaborated closely with other State government agencies with an interest in emergency medical services, including the Department of Public Instruction; Department of Transportation; Lieutenant Governor's Childhood Trauma and Injury Prevention Task Force; Wisconsin Board of Vocational, Technical and Adult Education; and Wisconsin Comprehensive Childhood Injury Prevention Unit, Bureau of Community Health and Prevention.

EXPERIENCE TO DATE: Since its inception, the Wisconsin EMSC Project (the task force supported by project staff) has geared its activities toward achieving stated goals and objectives. Project accomplishments/products have pertained to one of two project components: Data development, or public information and education.

The project achieved the following objectives in data development:

1. Analyzed existing data sources on pediatric emergency medical services in Wisconsin with special attention to three targeted populations: Rural, Native American, and children with special medical needs. Development of a classification system for analysis of pediatric death certificates and of hospital discharge data. Assessment of the accessibility and quality of data in ambulance run reports. Case review of the quality of care in pediatric emergencies and of strategies for injury prevention.
2. Analyzed the nature and incidence of pediatric emergency deaths in Wisconsin over a 3-year period, and hospitalizations over a 1-year period.
3. Developed, published, and distributed assessment and treatment guidelines for acute pediatric illness and injury cases for use by basic level emergency medical technicians (EMTs) for inservice training and field use.
4. Developed, published, and distributed advanced life support (ALS) assessment and treatment guidelines.
5. Developed a plan to expand the State EMS communications system, enhancing the availability of online medical direction.
6. Published and distributed ambulance equipment recommendations for basic and advanced level ambulance services.
7. Developed a 16-hour pediatric emergency care course for the basic life support prehospital care provider.
8. Conducted three instructor training courses on pediatric emergency care for 68 instructors, including representatives from Iowa, Minnesota, and the Wisconsin Native American community.
9. Helped to establish a network of nine hospital training centers throughout the State.
10. Collaborated with the National EMSC Project and the Wisconsin Emergency Nurses Association in developing a pediatric course for emergency department nurses.

The project achieved the following objectives in public information and education:

1. Designed and produced a logo, project brochure, and display board that provide information on the project;
2. Expanded FIRST CARE, a farm safety program through a contract with the Wisconsin Farm Bureau Federation;
3. Developed, published, and distributed EMS access telephone cards and a pediatric poster depicting responses to choking;
4. Developed a rural media campaign;
5. Conducted EMT conferences on public information and education; and
6. Coordinated a Midwest Regional Pediatric EMS Conference (fall 1990).